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ROBERT A. BARON

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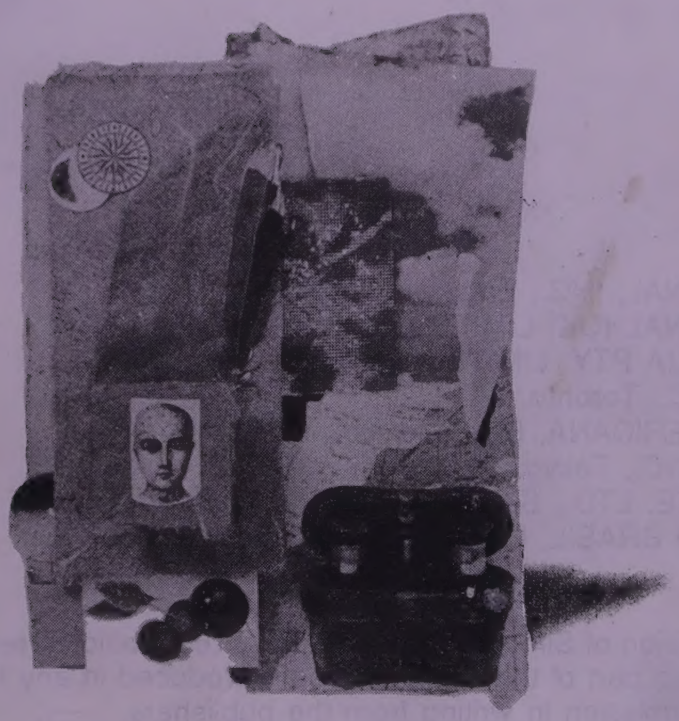

ROBERT A. BARON

RENSSELAER POLYTECHNIC INSTITUTE

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To Peter Murdoch, Roger Black, and Donn Byrne—
friends and colleagues who shaped the way psychology became part of my life

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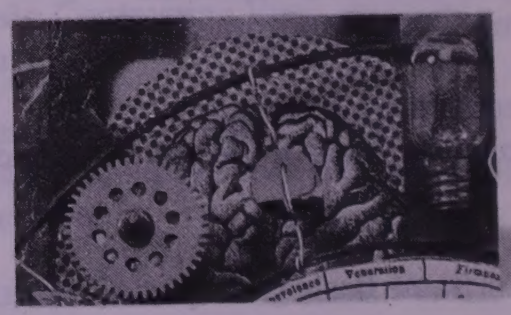

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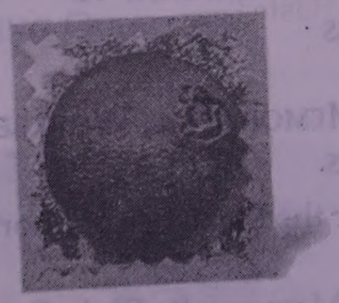

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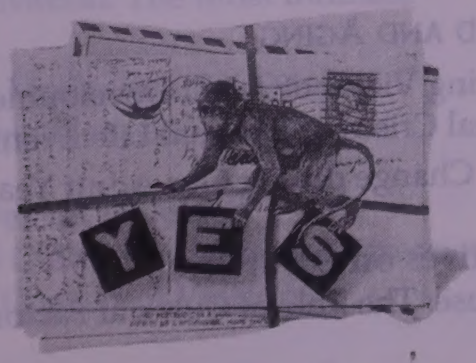

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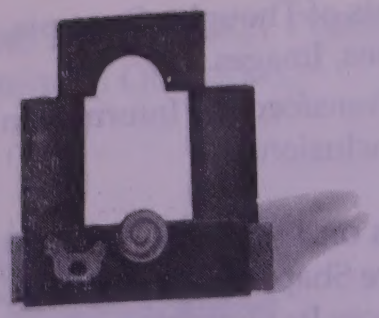

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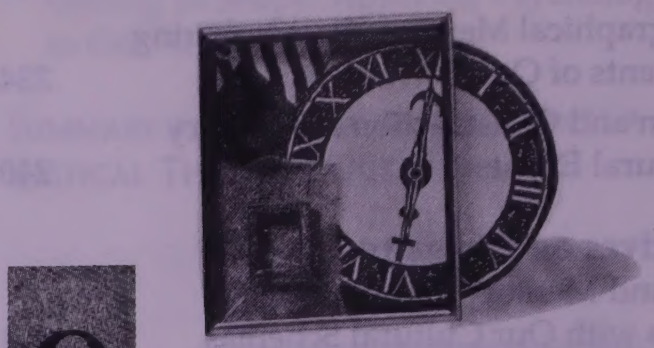

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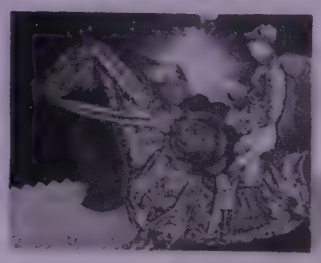

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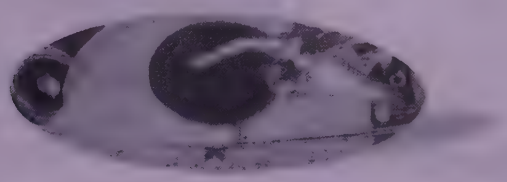

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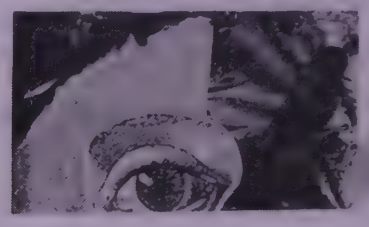

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Preface

Why Psychology Matters: Reflections of a Long-Term Believer

In the mid 1970s, when I was on the faculty of Purdue University, I had friend named Sam. Sam was an analytical chemist and one of the most brilliant people I have ever known. But what Sam didn't know *people* would fill several books. Let me give you an example.

Sam was perpetually having problems with his department's copy room. Many jobs he sent there were not done on time—a real problem for him since he constantly worked against tight deadlines. After listening to Sam moan about this problem over and over again, I asked him the following questions: (1) Did he ever bring his really important jobs to the copy room himself rather than sending them down with his secretary? (2) Did he ever thank the people involved when copies were ready on time? Sam was puzzled by my questions. He couldn't see any purpose in visiting the copy room in person, and his attitude about on-time jobs was simple: Why should he thank someone for simply doing his or her job?

When I suggested that both of these steps might help, Sam seemed doubtful. But he was open-minded; so he promised to give them a try. Several weeks later, he reported that they did seem to help. In fact, he said, after he thanked the copy-room staff in person a few times, a miraculous change occurred: They began to put his work on top of the stack rather than on the bottom. Sam was happy about this change, but confused about *why* it had occurred. When I described the basic principles of reinforcement to him, he listened in rapt attention. Here, I could tell, was something entirely new for Sam, world-class scientist though he was. Yes, Sam was brilliant, but as he himself admitted, he almost never thought about people.

I haven't seen my friend Sam in many years, but I'm tempted to dedicate this book to him. To me, he is a perfect illustration of the importance of psychology and of why everyone—top-notch scientists included—needs a basic, working knowledge of it. Psychology, I have long believed, is much more than a scientific field or a collection of findings and principles: It is also an invaluable perspective for understanding ourselves, other people, our relationships with them, and just about everything else that really matters to most of us most of the time. It is, in short, an eminently useful field, with important practical benefits for anyone wise enough to use it, or at least to adopt it as a personal framework. So, it's no exaggeration to state that I strongly believe in the theme of this new edition: *making psychology part of your life.* Psychology should be part of everyone's education and, ultimately, everyone's life. With it, and the knowledge it provides, we gain enhanced insight into virtually every aspect of our experience. Without it, we must struggle along like my friend Sam, constantly puzzled by our own reactions, others' behavior, and many aspects of daily existence.

Because of my strong convictions about the practical as well as the scientific value of psychology, this text is designed to do more than simply present a broad and up-to-date introduction to the field. It seeks to bring the *usefulness* of psychology sharply into focus, to illustrate its relevance and application to daily life—everyone's daily life. In order to attain this goal, I've incorporated many new features. These and other changes are summarized below.

Special Features Related to the Book's Major Theme

This new edition has many features designed to contribute to the theme described above. The most important of these are as follows.

Making Psychology Part of Your Life

These special sections illustrate how readers can actually apply the information presented in each chapter to their own lives. The features cover a wide range of topics, including the following:

Chapter 3	The Danger of Stereo Headsets: Let's Turn Down the Volume
Chapter 6	Improving Your Memory: Some Useful Steps
Chapter 9	Preparing for Tomorrow's Job Market Today
Chapter 10	Getting Motivated: Some Practical Techniques
Chapter 12	How Accurate Is Your Self-Concept?
Chapter 16	Are You in Love? One Way of Telling

The Point of It All

These special sections—virtually all of which are new to this edition—illustrate the implications and applications of psychology's findings and principles to important practical issues. Here are a few examples:

Chapter 2	Using Knowledge of Synaptic Transmission to Treat Addictions: Fighting Fire with Fire
Chapter 6	Repression: Do We Sometimes Forget Because We Want to Forget?
Chapter 8	Attention-Deficit Hyperactivity Disorder: Kids Who Really *Can't* Sit Still
Chapter 9	Overcoming the Odds: Adolescents in High-Risk Environments
Chapter 12	Predicting Presidential Greatness: The Role of Personality
Chapter 16	Practical Uses of Dissonance: Hypocrisy and the Alteration of Societally Important Attitudes
Chapter 17	Computer-Based Work Monitoring: Maybe "Big Brother" Is Watching after All—through the Computer

Perspectives on Diversity

This new feature takes account of growing interest among psychologists in cultural diversity, and the fact that most readers of this text are likely to encounter increasing cultural diversity themselves in the years ahead. Understanding the role of cultural and ethnic factors in behavior, therefore, is crucial to applying psychology to everyday life. Here is a sampling of topics covered in the new diversity sections:

Chapter 2	The Biological Basis of Gender Differences
Chapter 4	Culture and the Interpretation of Dreams
Chapter 6	Culture and Memory: Remembering What Fits with Our Cultural Schemas
Chapter 7	When Culture Shapes Reasoning—or At Least Influences Its Outcomes
Chapter 9	Menopause: The Role of Cultural Factors
Chapter 10	The Role of Cultural Factors in Aggression: The Social Context of Violence
Chapter 14	Taking Account of Cultural Factors in Psychological Disorders: Improvements in the DSM-IV
Chapter 17	Negative Effects of Gender Stereotypes: Why Males Often Get the Job

Experiences from My Own Life

In every chapter, I describe situations and experiences from my own life (or, in some cases, from Michael Kalsher's life) that are related to the topics presented. This allows me to illustrate, in a very personal way, the relevance of psychology's principles and findings to everyday life. Descriptions of these experiences are integrated into the content of the book, and several appear within each chapter.

Special Features Designed to Enhance Learning

In addition to the features described above, this new edition incorporates many features designed to enhance learning.

Key Points

Each major section ends with a capsule overview of the key points covered, designed to catch the reader's attention. These points provide readers with frameworks for organizing—and hence retaining—chapter content.

The Research Process

These sections are designed to illustrate the process of psychological research:

- How psychologists use research to answer important questions about human behavior
- Why one line of research leads to others
- How the findings of psychological research are interpreted and contribute to the development of accurate theories

The Research Process sections now include critical thinking questions designed to get students actively thinking about the process of psychological research and how it is used to add to our knowledge of human behavior. Again, a wide range of topics is covered in these sections, for example:

Chapter 3	DANGER—Warnings Are Effective Only under Certain Conditions; Develop Them with CAUTION
Chapter 5	Stimulus Control in Action: Promoting Paper Waste Recycling on a University Campus
Chapter 7	Animal Cognition: Tails of Intelligence
Chapter 9	Age, Intelligence, Wisdom, and Creativity: Change or Stability across the Lifespan?

Chapter 11	Integrating the Evolutionary and Social Exchange Models of Mate Preferences: Taking Account of Our Own "Market Value"
Chapter 13	Changing Risky Behaviors: An Ounce of Prevention Is the Only Known Cure
Chapter 15	Subliminal Self-Help Audiotapes: Do They Deliver What They Promise?

Key Concept Pages

The special Key Concept pages are designed to accomplish two goals:

1. They illustrate concepts and principles students often find difficult to understand (for example, the difference between punishment and negative reinforcement).
2. They summarize and integrate topics covered in the text (for example, contrasting theories of emotion).

In short, they are graphically appealing, informative, and useful aids to learning.

Chapter Openings

Chapters typically start by asking readers to consider a number of interesting questions about the topics being covered. This engages their interest immediately. A detailed road map to the chapter contents also is provided. This is a hallmark of my texts, and I've devoted special effort to making these as clear and useful for students as possible.

Critical Thinking Questions

Critical Thinking Questions appear in three locations in all chapters:

1. Integrated within the regular text (readers are often asked to think about various aspects of behavior and predict what they or others might do in a given situation)
2. Within Research Process sections
3. At the end of each chapter

These questions are designed to stimulate critical thinking—an important goal for any psychology text.

Changes in Content

Psychology doesn't stand still, so neither should any text that represents it. With this in mind, I've made many important changes in content.

New Chapters

- Chapter 11, "Individual Differences I: Intelligence, Gender," has been completely rewritten and is now part of a two-chapter sequence on individual differences (along with Chapter 12, "Individual Differences II: Personality"). The coverage of gender is new and is complete and current.
- Chapter 16, "Social Thought and Social Behavior," has also been completely rewritten in order to present the major topics of social psychology in a single chapter. All major areas of the field are included. In addition, the chapter calls attention to social psychology–related topics covered elsewhere in the book (for example, leadership in chapter 17).
- Chapter 17, "Psychology Goes to Work: Industrial/Organizational Psychology and Human Factors," is a brand new chapter, included at the request of many reviewers. It covers two important areas of psychology that are often neglected. Topics covered include work motivation, performance appraisal, leadership, and the design of controls and displays.

New Topics within Chapters

So many new topics have been included that I could not possibly list all of them here. Here is a sampling:

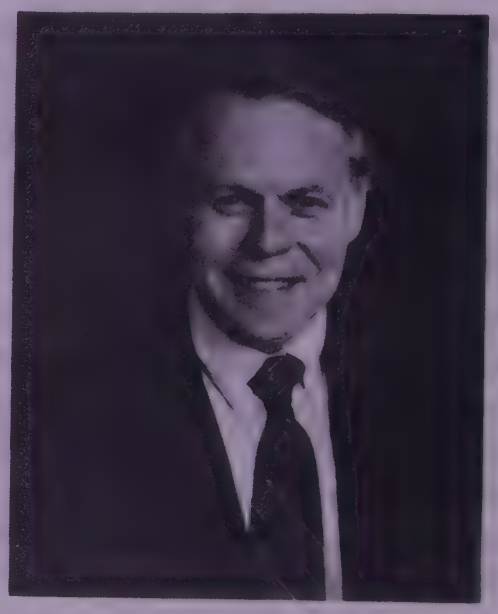
Evolutionary Perspective
Ethical Issues in the Practice of Psychology
Interpreting Diverse Results: Meta-Analysis and the Search for an Overall Pattern
Multiple (Cognitive) Resource Theory
Warning Labels: When Are They Effective?
New Findings on the Effects of Pleasant Fragrances on Behavior
Potential Benefits of Increased Self-Consciousness
Dreams of Absent-Minded Transgression: Their Role in Quitting Smoking and Reducing Alcohol Consumption
Stimulus Control of Behavior and Protecting the Environment
Operant Conditioning and Seatbelt Use
Memory for the Time When a Past Event Occurred
Repression of Memories of Childhood Sexual Abuse
The Oversight Bias in Reasoning
Artificial Intelligence and Neural Networks
Information Processing and Cognitive Development
Cognitive Variability and Cognitive Development
Fathers and Attachment
Adolescent Invulnerability

Successful Development in High-Risk Environments
Gender Differences in Sexual Jealousy
Effects of Mood on Information Processing
Gender Differences in Social Behavior, Mate Selection, and Psychological Adjustment
The Neuroscience Approach to Intelligence
Personality and Presidential Greatness
Sensation Seeking
The Potential "Downside" of High Self-Esteem
Stress from Natural and Human-Caused Disasters
Changing Risky Behaviors
DSM-IV
Posttraumatic Stress Disorder
Chronic Mental Illness and the Homeless
Settings for Therapy
Prevention of Psychological Disorders
Tilts in Social Cognition: Automatic Vigilance, Motivated Skepticism
Troubled Relationships: When Love Dies
Human Factors: Design of Controls and Displays
Workplace Environments

In addition, I should note that coverage of genetic factors in behavior and what has come to be termed *evolutionary psychology* has been increased considerably. These topics are discussed in several chapters (including 2, 3, 8, 10, and 17).

Some Final Comments . . . and a Request for Help

Friends who know me well often describe me as a "high sensation-seeker," and I think they are right: I'm not one who likes to sit back, put my feet up, and take a rest. I am always getting involved in new projects. Given this fact, the scope of the changes outlined above isn't at all surprising—a "stand-pat" approach is just not my style. But I also believe that these changes have not been instituted just for the sake of change; rather, they reflect my desire to make the book better in every possible way, to respond to helpful feedback from adopters and students, and—just as important—to make it obvious to readers, no matter what their background or interests, that psychology really does matter! But as always, only you, my readers and colleagues, can tell me whether, and to what extent, I've succeeded in achieving these goals. So please, do write, call, or fax me with your comments and suggestions. I'll listen carefully, and the odds are good that you'll see them reflected in the next edition. Thanks in advance for your help.



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Acknowledgments

Some Words of Thanks

Writing, as my family well knows, is a solitary activity that occurs largely behind closed doors. Converting an author's words into a book, however, requires the help of many persons. In preparing this new edition, I have been aided by a large number of talented people—too many, in fact, to thank here. However, I do wish to express my appreciation to those whose help has been most valuable.

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To all these truly excellent people, and to many others, too, I offer my warm personal regards.

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Psychology

Psychology:

Its Nature, Scope, and Methods

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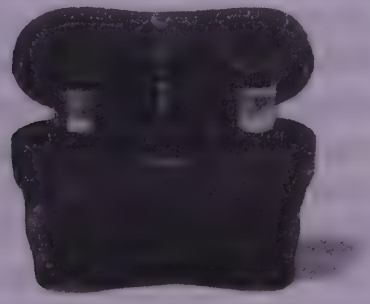

Do the things other people do and say ever surprise you? Are you sometimes puzzled by your own thoughts, feelings, or reactions? Do you wonder what you'll be like in five years or ten years? Or think about how you compare with other persons in terms of your intelligence, personality traits, happiness, or psychological adjustment? If so, then welcome to the club: Most people spend a lot of time pondering just such issues.

What most of us do on a part-time basis with respect to our own lives and experiences, psychologists pursue as a full-time career. They seek to obtain scientific information on virtually every imaginable aspect of human behavior—everything from how our senses function and how our memories operate to why

we fall in love, what factors or conditions motivate us to work hard, and why we become depressed. In fact, as you can see in Table 1.1, the field of psychology is so broad in scope that I am confident of the following fact: Psychologists are currently studying every question about human behavior you have ever contemplated—and many you have probably not yet considered.

One major goal of this book, therefore, is acquainting you with the knowledge psychologists have attained through the systematic study of human behavior. There are many specialties in psychology, and psychologists in these subfields have focused on different aspects of behavior—for example, on memory, human development, and psychological disorders, to name just three major areas of the field. Reflecting this fact, each chapter will focus on a different aspect of behavior. But since I want to present an *integrated* view of psychology, I'll often indicate how these various aspects of behavior are related, and how ideas and concepts reported in one portion of the book are related to those in other portions.

PSYCHOLOGISTS SEEK TO OBTAIN SCIENTIFIC INFORMATION ON VIRTUALLY EVERY IMAGINABLE ASPECT OF HUMAN BEHAVIOR.

A second, and equally important, goal stems from my belief that psychology is not only a scientific field of study—it is also an eminently *useful* and *practical* one. In other words, I firmly believe that you can profit greatly from applying to your own life the information presented in this text. In keeping with this view, I will consistently call attention to the practical aspects of psychology's findings, and how, perhaps, you can apply them. Thus, an important theme of this book is **Making Psychology Part of Your Life**, and you'll see this theme reflected in many ways in every chapter.

Before I can turn to the findings of modern psychology and its potential uses, however, it's important to provide you with some basic facts about the nature and scope of the field. One important reason for doing so is suggested by the findings of psychological research on memory and thinking (covered in chapters 6 and 7). This research indicates that having a mental framework in which to place new information makes it easier to understand, remember, and use. In view of these findings, I'll use the rest of this chapter for the purpose of providing you with a "mental scaffold" for studying psychology—a framework that will help you to understand new information as it is presented. This framework will consist of several distinct parts.

First, I'll provide a brief summary of psychology's history and offer an overview of its scope and nature today. In this context, I'll call special attention to psychology's growing concern with a multicultural perspective. I'll also answer several key questions about the nature of psychology often asked by students encountering it for the first time (for example, is it really scientific?). Second, I'll say a few words about modern psychologists—who they are and what they do. Third, and perhaps most important, I'll describe the methods used by psychologists in their research. These are the techniques used to gain new insights into various aspects of behavior. At this point, I'll also address some of the ethical issues faced by psychologists in their research and in the practice of their profession. Next, I'll describe the organization of this text, some special features it contains, and how these can help your studying. Finally, I'll consider the question of what you, as an individual, will gain from your first exposure to psychology. Included here will be discussion of **critical thinking**—the ability to make objective judgments about statements and claims, judgments based on careful reasoning and close scrutiny of available facts. As you'll see throughout this text, critical thinking is an essential ingredient in psychology, and learning to think like a psychologist (at least where questions about behavior are concerned) is one of the most important benefits you will gain from this text and from your first course in this field.

OFTEN, WE'RE PUZZLED BY OTHERS' BEHAVIOR

Are you ever surprised by other people's actions? This is one reason why many persons are interested in the field of psychology.

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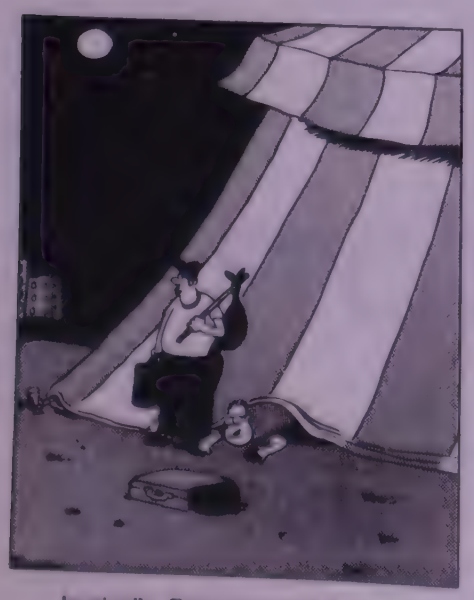


Ironically, Barnum's and Bailey's respective kids—Sid and Marty—both ran away one night to join corporate America.

Topic/Issue	Chapter
Why do some people have so much difficulty regulating their weight?	2
How can we perform two activities at once—such as driving while talking to a friend?	3
What is hypnotism? Is everyone susceptible to it?	4
Can we learn simply by watching others?	5
Does being in a good mood increase creativity?	7
How do children acquire a sense of morality?	8
Do people become less intelligent as they age?	9
Can changes in our facial expressions influence our moods?	10
Do females and males differ in the way they choose romantic partners?	11
What are the most important dimensions of personality—the most central traits?	12
Why are some people so much more resistant to stress than others?	13
What is schizophrenia? What are its causes?	14
Does psychoanalysis really work? Or are there more effective kinds of therapy?	15
Can our attitudes be changed by information of which we are not aware?	16
Why do people often do better at various tasks when they have specific goals for their own performance?	17

Table 1.1

The Breadth of Psychological Research

As shown here, psychologists are currently investigating almost every imaginable aspect of human behavior.

Psychology: What It Is and How It Developed

What, exactly, is psychology? As you'll soon see, the definition has changed and evolved during its relatively short history. Today we define **psychology** as *the science of behavior and cognitive processes.* In other words, psychologists are concerned with obtaining scientific information on everything we (and other living organisms) think, feel, and do. They examine observable behavior, cognitive processes, physiological events, social and cultural influences, and hidden and largely unconscious processes. They also look at the complex interactions between all of these different factors in order to understand behavior.

How did the field of psychology come to exist? In movies and television shows, scientists are sometimes represented as magnificent loners—geniuses who work in isolation and develop major breakthroughs out of their own creative spirit. While this sometimes occurs, another pattern is more frequent: Progress flows naturally from what went before. Modern psychology is no exception to this general rule. When it emerged as an independent field of study in the late nineteenth century, it had important roots in several other disciplines, ranging from philosophy on the one hand to biology and physiology on the other.

Critical Thinking: *Careful assessment of available evidence in order to evaluate claims and statements in an objective and reasoned manner.*

Psychology: *The science of behavior and cognitive processes.*

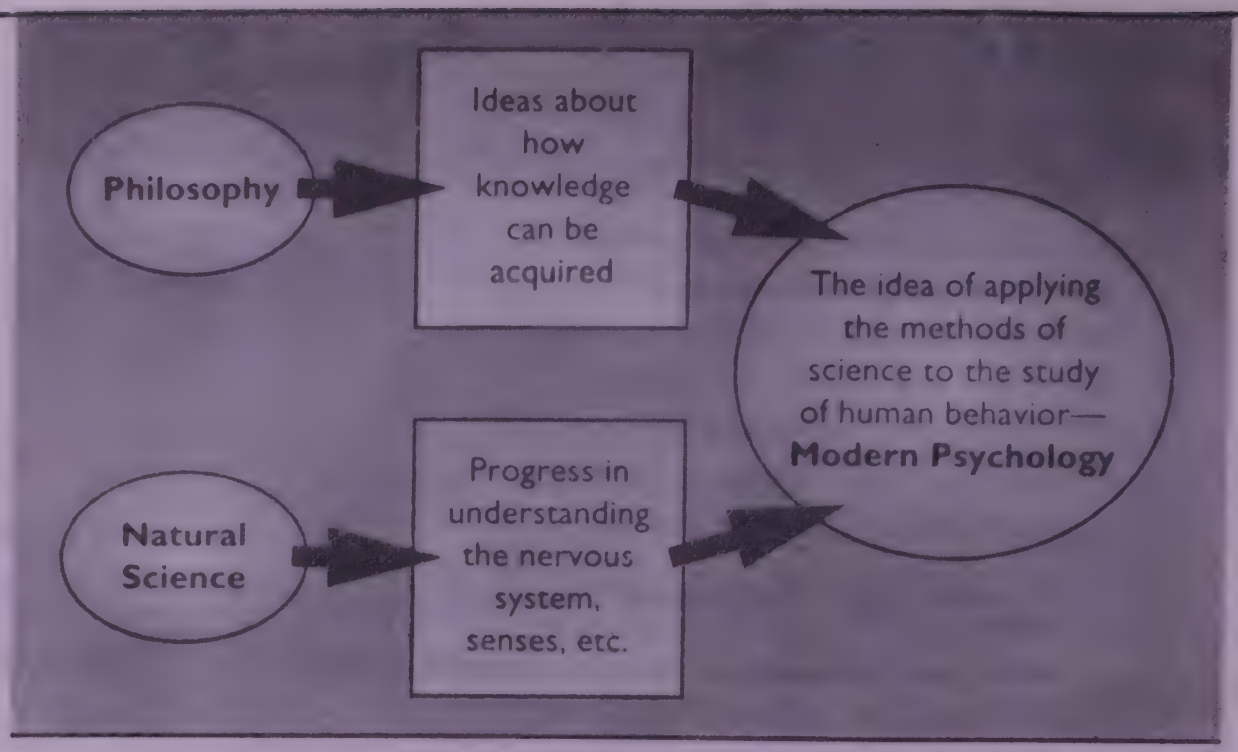
Philosophy and Science: The Dual Roots of Modern Psychology

From philosophy came two important influences: (1) the logical underpinnings of science, or ideas concerning the ways in which we can acquire valid

FIGURE 1.1

The Dual Roots of Psychology

Psychology emerged as an independent field of study when ideas from philosophy (about how valid knowledge of the natural world can be obtained) were applied by scientists in other fields to the task of understanding human behavior.



knowledge about the natural world, and (2) ideas concerning the relationship between mind (mental events) and body. With respect to the philosophy of science, two very important ideas were *empiricism*, the view that knowledge can be gathered through careful observation, and *rationalism*, the view that knowledge can be gained through logic and careful reasoning. During the eighteenth and early nineteenth centuries these two traditions combined with other lines of philosophical thought to yield the basic ground rules of modern science. Psychology took shape as an independent field of study when a number of scientists with training in such fields as biology, physiology, and medicine concluded that the methods of science could be applied to the understanding of many aspects of behavior.

Turning to the mind-body issue, seventeenth-century philosophers rejected the idea that mind and body are separate (a view known as *dualism*) and suggested, instead, that they interact: Mental events can influence physical ones and physical events can influence mental ones. This view, known as *interactionism*, is a key principle in modern psychology, as you'll see when we consider the complex relationship between feelings and thought in chapter 10.

In short, psychology emerged when (1) ideas in philosophy—especially ideas about how new knowledge can be acquired and about the relationship between mind and body—and (2) progress in several scientific fields combined to create an environment in which the idea of the scientific study of human behavior could emerge (see Figure 1.1).

As is true of all new fields, however, psychology did not spring into existence fully formed; nor was there agreement among its early founders as to just what the new science should be or what it should study. On the contrary, early psychologists disagreed sharply about these issues. Since these disagreements played an important role in shaping the nature of our modern field, I'll touch on them briefly.

Psychology: Some Early Views

Perhaps a useful way of illustrating important shifts in how psychologists have defined their field is to imagine a conversation between three major figures in the history of the field. Wilhelm Wundt was the founder of the first psychological laboratory (1879); William James wrote an early influential

text, *Principles of Psychology*, and had a lasting impact on the field; and John B. Watson founded an approach that dominated the field until well into the twentieth century. (Please note that this conversation is purely imaginary. There is no indication that these people ever met face to face. If they had, however, they might well have made comments such as these.)

WUNDT: In my opinion, psychology should focus on the study of conscious experience. Our task is that of analyzing sensations, feelings, and images into their most basic parts, just as chemists analyze complex substances. In that way, we'll come to understand the nature of the human mind—what it is. We can accomplish this through introspection—asking individuals to describe what is going on in their own minds as they perform various tasks or have specific experiences.

JAMES: I disagree. The mind isn't static. It is always changing. Also, it is useful—probably the most useful thing we possess. So the key task for psychology should be understanding how the mind functions in everyday life—how it works, and how it helps us adapt to a complex and ever-changing world. To understand the human mind, we have to study how it functions. We need to know how people form habits, how they form their ideas of their own selves, and how they experience emotions. Identifying the basic components of the mind is interesting, but it provides only part of the total picture.

WATSON: You're both all wet. We can't see "mind" or "conscious experience." All we can observe is overt behavior. And people can't report accurately what goes on in their "minds"—whatever those are! The idea of using introspection as a research method to build our new science is ridiculous. Overt behavior is the only thing we can observe or measure scientifically, so that should be the focus of psychology.

As you can readily see, these three individuals held sharply contrasting beliefs about the nature of psychology. Wundt was the chief advocate of **structuralism**: the view that psychology should focus on conscious experience and on the task of analyzing such experience into its basic parts. In contrast, James was a vigorous supporter of **functionalism**: the view that psychology should study the ways in which the ever-changing stream of conscious experience helps us adapt to, and survive in, a complex and challenging world. And Watson was the foremost spokesperson for **behaviorism**: the view that psychology should focus solely on observable, overt activities, ones that can be measured in a scientific manner. Events and processes going on "inside,"such as thoughts, images, feelings, and intentions, have no place in the field.

Which view prevailed? For many years, Watson's behaviorism was dominant—the view that psychology should focus solely on aspects of behavior that can be directly observed and measured. Indeed, for almost sixty years psychology was defined, by and large, as the science of behavior. While this strong emphasis on observable behavior persists, the scope of modern psychology broadened considerably during the 1960s and 1970s, to include many topics Watson and other early behaviorists would *not* have included in the field. What are these topics, and how did psychology evolve into its present, eclectic, form? To see, let's briefly consider the history of psychology during the twentieth century.

Structuralism: *An early view suggesting that psychology should focus on conscious experience and on the task of analyzing such experience into its basic parts.*

Functionalism: *An early view of psychology suggesting that psychology should study the ways in which the ever-changing stream of conscious experience helps us adapt to a complex and challenging world.*

Behaviorism: *The view that psychology should study only observable behavior.*

Wilhelm Wundt (1832–1920)

Wundt is considered by many to be the founder of psychology. He developed the first widely accepted school of thought, *structuralism*, which focused on the inner workings of consciousness. In 1879 he opened the first psychology laboratory at the University of Leipzig in Germany.

William James (1842–1910)

James is known as the first American psychologist. He authored the first widely used psychology textbook, *Principles of Psychology*, in 1890. He led the movement of *functionalism*, which focused on how and why the mind functions.

John B. Watson (1878–1958)

Watson moved psychology away from studying the contents of the mind to studying only observable behavior, an approach known as *behaviorism*.

Key People in Psychology

Psychology during the Twentieth Century: How It Developed and Grew

Watson unfurled the banner of behaviorism as the decade of the Roaring Twenties began. Yet much important work had already been completed by psychologists prior to that time. For example, tests designed to measure intelligence and other human characteristics had already been devised and been put to practical use (Binet & Simon, 1905). Sigmund Freud had already published many aspects of his famous theories on human personality and psychological disorders (Freud, 1901, 1915). And much had already been learned about the functioning of our senses (Fechner, 1860) and the operation of human memory (Ebbinghaus, 1913).

In the decades that followed, the pace of progress within psychology accelerated sharply. During the 1930s and 1940s, C. L. Hull, B. F. Skinner, and other behaviorists uncovered much new information about learning and related topics (Hull, 1943; Skinner, 1953). Important work on conformity, leadership, and other aspects of social behavior was performed during the same period (e.g., Lewin, 1947; Sherif, 1935). In the 1950s the scope of psychology expanded greatly, and major advances were made in knowledge about human development (Piaget, 1954), motivation (McClelland et al., 1953), functioning of the human brain (Lashley, Chow, & Semmes, 1951), and many other topics.

The 1960s brought the emergence of many new interests and subfields. One of these is *environmental psychology*—the study of how behavior is affected by the physical world around us (see chapter 17). Another is *psychology and law*—a field that focuses on how basic psychological processes (memory, perception, social influence) can, and do, affect the legal process (see chapter 6). In addition, of course, rapid progress continued in existing areas of research.

During the 1970s and 1980s, psychology, in a sense, came fully into its own. It gained increasing recognition as an active and valuable branch of science. Moreover, its scope expanded even further with the emergence of such new fields and specialties as *adult development* (development and change during the adult years; see chapter 9), *gender differences* (differences between the sexes; see chapters 2 and 11), and *health psychology* (the impact of various psychological factors on physical health; see chapter 13). Many other fields and lines of research, too numerous to mention here, also emerged during these exciting decades. The result is that psychology has now expanded its scope to the point where it studies virtually every question about human behavior you can possibly imagine—and then some.

By design, this capsule overview of the history of the field is extremely brief. However, the information I've presented should provide you with at least a rough idea of how the field has grown and developed during the twentieth century (see Figure 1.2 on pages 8–9).

Modern Psychology: Some Key Perspectives

Earlier, I defined psychology as the science of behavior and cognitive processes. Psychologists seek to obtain systematic information about all aspects of behavior—with behavior being very broadly defined—through the use of scientific methods. In order to obtain complete and accurate answers to the complex questions with which they grapple (refer back to Table 1.1), psychologists have found it useful to study behavior from several different perspectives. The most important of these are described next.

The Behavioral Perspective In an important sense, the behaviorist tradition is still very much alive and well in modern psychology. Indeed, most psychologists agree that only aspects of behavior that can be carefully measured, either directly or indirectly, have a place in a scientific field of psychology. Further, most agree that only concepts that can be related to observable aspects of behavior are useful from the point of view of a science-oriented psychology. For example, consider the question of what motivates people to work hard—to expend effort on their jobs. This is a key question studied by *industrial/organizational psychologists,* who are interested in all aspects of behavior in work settings. As you'll see in chapter 10, we can't observe such *work motivation* directly; it is an internal state that we assume exists inside people and affects their overt behavior—for example, how long and hard they work at a given task. But we *can* observe both the conditions we believe may influence motivation, such as the extent to which good performance is rewarded, and changes in overt behavior that appear to be linked to motivation, such as actual output, number of errors, and so on. In sum, modern psychology still focuses a great deal of attention on overt behavior, so this remains an important perspective within the field.

The Cognitive Perspective Consider the following incident. You have been asked to write a letter of recommendation for someone. How do you

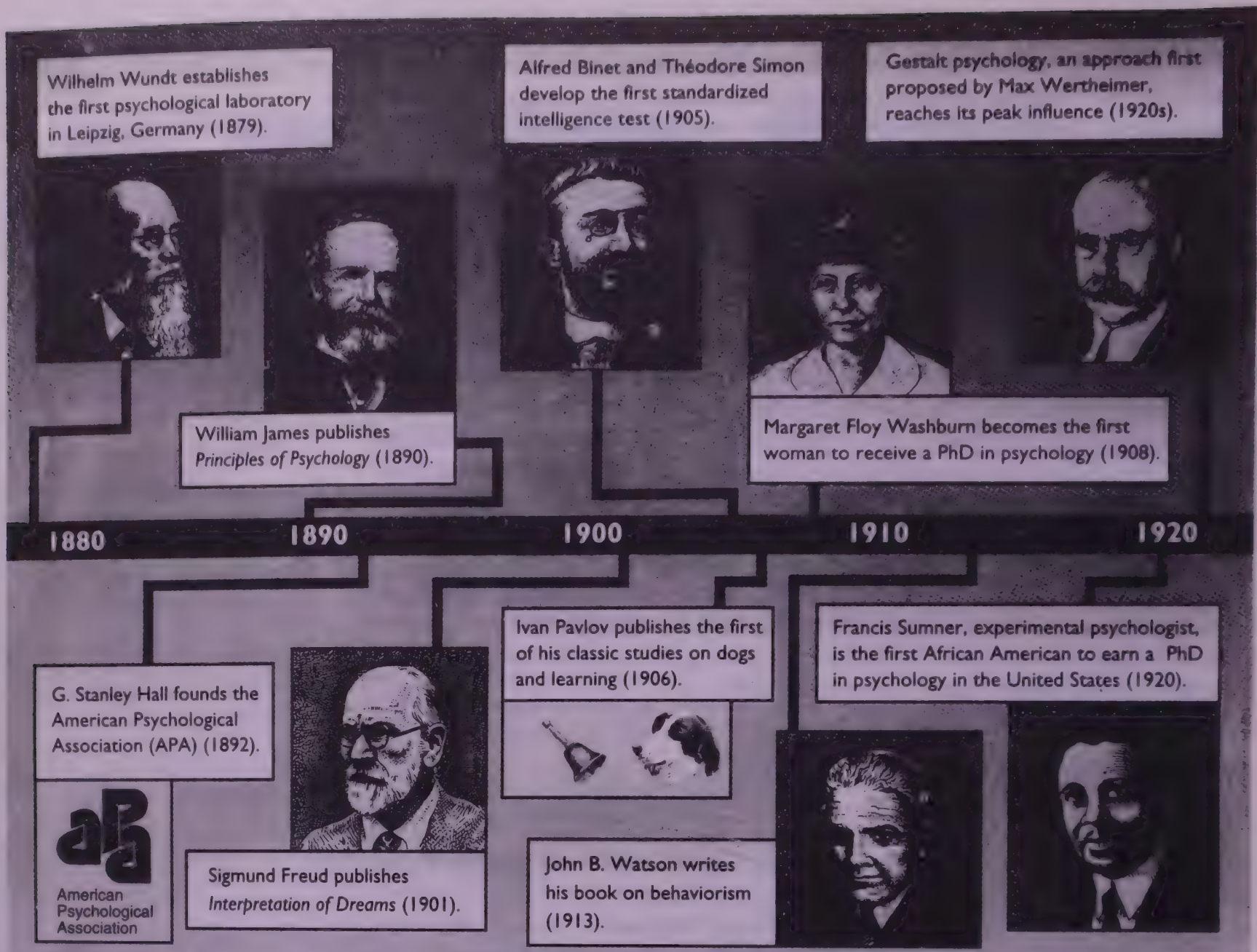


FIGURE 1.2

Milestones in the Development of Modern Psychology

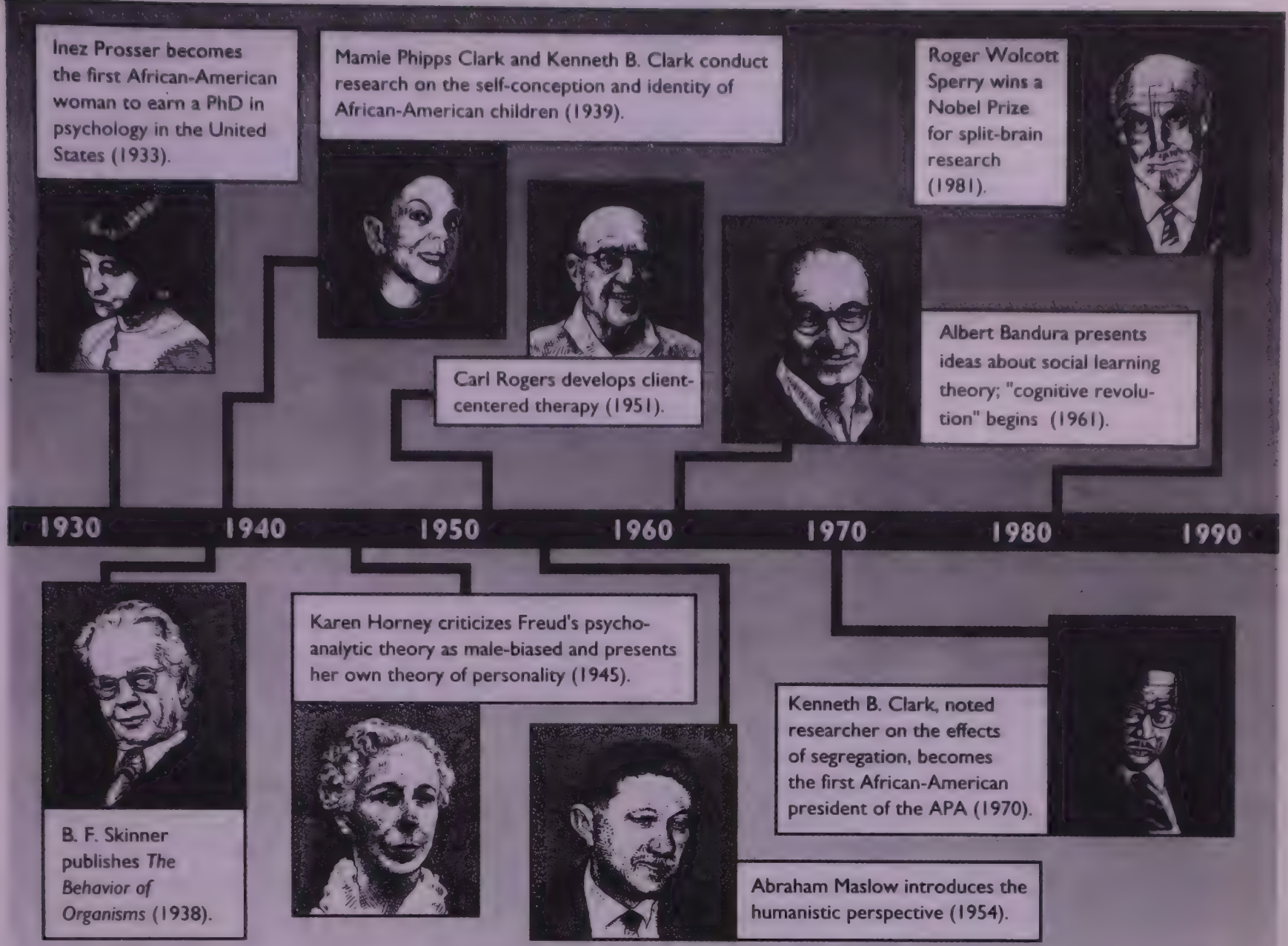
proceed? Probably, by thinking about this individual and bringing many incidents to mind. From these you try to extract some basic themes (e.g., she is intelligent; she is conscientious). Notice that you don't select just any themes or bring any incidents to mind. Rather, since this is a letter of recommendation, you tend to focus on positive experiences and events—ones that will help you write a good, supportive letter. Because you can only include in the letter information you recall, the workings of your memory are crucial to carrying out this task in the way you (and your friend) desire.

This and countless other events indicate that if we wish to understand people and how they behave, we must pay careful attention to **cognitive processes**: the ways in which people think, remember, decide, and so on. Indeed, many would argue that attempting to understand behavior without attention to cognitive processes is akin to trying to solve a complex jigsaw puzzle from which many of the most important pieces have been removed.

Cognitive Processes: *Mental activities involving the acquisition, representation, storage, retrieval, or use of information.*

Psychodynamic Perspective: *An approach suggesting that many aspects of behavior stem from hidden forces within our personalities.*

THE PSYCHODYNAMIC PERSPECTIVE Do dreams have any meaning? Why do people often experience slips of the tongue, saying, for example, "I could have killed him!" when they meant to say "I could have kissed him"? What accounts for bizarre forms of behavior often attributed to "psychological disorders" or "mental illness"? According to the **psychodynamic perspective**, these and many other puzzling aspects of behavior stem from continuous, and largely unconscious, struggles among hidden forces deep within our personalities. The most famous advocate of this perspective, of course, was



Sigmund Freud, a scholar whose views we'll discuss at several points in this book (chapters 12, 14, and 15). However, even psychologists who disagree strongly with Freud's theories of human personality and mental disorders accept the notion that behavior is often affected by forces, urges, and tendencies largely outside our conscious recognition. Consideration of these, too, is a part of modern psychology.

THE HUMANISTIC PERSPECTIVE Is there such a thing as *free will*? For behaviorists this question is irrelevant, since they contend that behavior is *determined* by a wide range of internal and external factors. Other psychologists, however, believe that such factors do *not* rigidly shape our actions, feelings, or thoughts. Rather, they contend, we can choose how to behave, regardless of the pressures exerted by the environments in which we live. Further, psychologists who adhere to the **humanistic perspective** emphasize the importance of tendencies toward *personal growth*—tendencies in each of us to try to become the best person we can be. Only when external obstacles interfere is the growth process interrupted; in such cases, humanistic psychologists contend, we may experience various psychological disorders stemming from disruption of our normal growth.

While some psychologists find the optimism of the humanistic perspective appealing, many feel that the approach is somewhat vague and difficult to test. However, it has called attention to several key issues, such as the importance of a favorable self-concept and the importance of continued growth and

Humanistic Perspective: *A perspective in modern psychology suggesting that human beings have free will and are not simply under the control of various internal and external factors.*

development throughout life. Thus, in these respects humanistic psychology has been influential, and it is certainly part of the rich tapestry of modern psychology.

The Biopsychological or Neuroscience Perspective What happens inside your body when you think, listen to music, grow hungry, or become angry? And what takes place when you dream, experience anxiety, become sexually aroused, or simply read a text such as this one? Obviously, *something* must be occurring in all these cases; we are living beings, and every experience we have must be accompanied, at some level, by biological events. Activity in our brains and other parts of the nervous system, hormones released by our glands and the bodily changes these induce—such processes are intimately linked to everything we do, think, feel, or say (Carlson, 1993). Psychologists have long recognized this fact and generally agree that understanding these biological roots is an essential component of the field.

The Evolutionary Perspective Does behavior stem primarily from inherited tendencies and related biological factors, or primarily from experience and learning? This question—often described as the *nature-nurture controversy*—has long been of interest to psychologists. Early behaviorists, of course, adopted a strict "nurture" position: They argued that behavior is entirely shaped by experience and the effects of learning. Indeed, in a famous quotation, Watson boasted that he could make any healthy infant into virtually any kind of adult simply by controlling all of its experiences (Watson, 1924, p. 194).

Modern psychologists generally reject such extreme views and adopt a much more balanced position with respect to the nature-nurture controversy. They realize that like all other species on our planet, human beings have an evolutionary history, which equips them with inherited tendencies or dispositions. It would be surprising if such tendencies played little or no role in our behavior. And in fact, growing evidence suggests that inherited dispositions do, indeed, exert important effects. Recognition of this fact has led to the emergence of the field of **evolutionary psychology**—a branch of psychology that studies the adaptive problems humans have faced over the course of evolution, and the behavioral mechanisms that have evolved in response to such environmental pressures (e.g., Nisbett, 1990).

Much evidence pointing to the potentially important role of genetic factors in human behavior is provided by the systematic study of identical twins who have been separated very early in life. Despite the fact that such individuals are often raised in sharply contrasting environments and have very different life experiences, they tend to show a considerable—sometimes amazing—amount of similarity with respect to many aspects of behavior. Indeed, they are far more similar with respect to various personality traits, interests, and even attitudes than pairs of unrelated persons or even nonidentical twins (who, of course, don't share all the same genes as identical twins do) (e.g., Keller et al., 1992). We'll review additional evidence pointing to the potentially important role of genetic factors in human behavior at several points in this book (for example, see chapters 2, 8, 9, and 14).

Evolutionary Psychology: *A branch of psychology that studies the adaptive problems humans faced over the course of evolution and the behavioral mechanisms that evolved in response to these environmental pressures.*

The Sociocultural Perspective Imagine the following situation. An American real estate agent is asked to find a suitable home for a high-ranking executive of a Japanese company that has just opened a large plant in the United States. Confidently, she takes the executive and his wife to see a house in the fanciest subdivision in town. As they enter the subdivision, the executive becomes nervous; and as they approach the house, both he and his wife

CULTURE HAS A MAJOR IMPACT ON OUR BEHAVIOR

For example, the distance between two people holding a conversation varies across cultures. In some, a distance of four to five feet is considered appropriate. In others, a much smaller distance is preferred.

become visibly upset. In fact, they tell the agent that they do not wish to see the house but would prefer to see another one located on the opposite side of town. The real estate agent is puzzled, because this house seems to be precisely what the executive and his wife are seeking. Why do they refuse to consider it? Later she finds out: the executive's boss lives in this subdivision, just down the block. From the Japanese perspective, buying a house in the same location would be viewed as inappropriate; in fact, it could be interpreted as an insult by the higher-ranking executive!

This incident provides one illustration of the fact that culture is a very important determinant of human behavior. In many cases, individuals' perceptions, feelings, and actions are strongly influenced by the social and cultural systems in which they live. In order to fully understand many aspects of behavior, therefore, one must take such factors into account. Psychologists have become increasingly aware of this fact in recent years and, as a result, have adopted an increasingly multicultural perspective on all of the topics that they study (e.g., Smith & Bond, 1993). We'll return to some of the implications of this perspective below. (See Table 1.2 on page 12 for an overview of these different perspectives.)

KEY POINTS

- Psychology is the science of behavior and cognitive processes.
- Early psychologists differed sharply over the scope of their new field: Structuralists felt that psychology should seek to identify the basic parts of consciousness. Functionalists believed that psychology should focus on the adaptive value of the human mind. Behaviorists felt that psychology should focus primarily on observable behavior.
- In their efforts to answer complex questions about behavior, psychologists have adopted several different perspectives, including the behavioral, cognitive, psychodynamic, humanistic, biopsychological, evolutionary, and sociocultural perspectives.

PSYCHOLOGY IN A DIVERSE WORLD: *THE MULTICULTURAL PERSPECTIVE*

When I was a high school junior, the world was a very different place. One crucial way in which it differed from the world of today involved much lower levels of cultural or ethnic diversity. Perhaps a few statistics will bring the scope of this change into focus:

- In 1960, approximately 90 percent of the people living in the United States were of European descent; in the mid 1990s, this figure is about 80 percent, and is dropping quickly; it is projected that by the year 2050, it will decrease to only 53 percent.
- In just a few years (by 2000), no single group will constitute a majority in California, the most populous state in the United States; similar situations will be reached in several other states (e.g., New York) a few years after that.
- As recently as 1970, more than 98 percent of the people living in such countries as France, Germany, and Italy were native-born; today this

TABLE 1.2

Major Perspectives of Modern Psychology

As indicated here, modern psychology includes many different perspectives or approaches within its boundaries.

PERSPECTIVE	FOCUS/MAJOR INTERESTS
Behavioral	Focuses on overt, observable behavior; concepts are viewed as useful only if they can be related to overt behavior.
Cognitive	Focuses on cognitive processes such as memory, thinking, decision making. Often adopts an information-processing approach.
Psychodynamic	Emphasizes the role of internal forces and conflicts in behavior. Views many actions, and many forms of psychological disorders, as stemming from unconscious impulses or forces.
Humanistic	Emphasizes the importance of tendencies toward personal growth. Assumes that individuals have free will with respect to their own behavior.
Biopsychological	Relates behavior to biological and physiological events and processes, especially those occurring in the nervous system.
Evolutionary	Suggests that behavior is shaped to some extent by inherited tendencies and dispositions. Often focuses on the task of determining the relative importance of genetic factors and experience with respect to specific aspects of behavior.
Sociocultural	Focuses on the impact of cultural factors on various aspects of behavior. Recognizes that behavior is often strongly determined by such factors.

WOMEN AND MINORITIES IN PSYCHOLOGY'S EARLY DAYS

Despite major barriers that operated against their obtaining higher education, women and minorities made important contributions to psychology in its early decades. Shown here are Mary Whiton Calkins (1863–1930) and Albert Sidney Beckham (1897–1964).

figure has dropped to somewhere just over 90 percent and continues to decrease in the face of massive migration from Eastern Europe, Africa, and Asia.

In short, many countries around the world now find themselves confronting much higher levels of cultural and ethnic diversity in their populations than was true in the past. In addition, the shift toward a true world economy in recent decades has led to dramatic increases in business contacts across national boundaries. When this is added to unprecedented levels of foreign travel, it is clear that more people from different cultures are in contact with one another now than at any time in the past.

What are the implications for psychology of this growing cultural diversity? In the view of many psychologists, they are nothing short of profound. For various historical reasons, psychology has, until recently, been primarily a North American and European–based field. Indeed, today, when there are more than 500,000 psychologists worldwide (Sexton & Hogan, 1992), almost one-third of them live and work in the United States. Further, a very large proportion of ongoing research is conducted in North America and Europe (Rosenzweig, 1992). Given these facts, it is not surprising that most of the key figures in psychology's past were Americans or Europeans. And, reflecting the state of the world as well as strong barriers against achievement by women and various minorities, a large proportion of these persons were white males. I should hasten to add that there were notable exceptions to this general rule. Women such as Mary Whiton Calkins made key contributions to the field. Calkins developed the method of paired associates, an important technique for studying memory; in 1905, she became the fourteenth president of the American Psychological Association (APA). And despite the existence of seemingly insurmountable barriers, minorities, too, numbered among the ranks of productive early psychologists. In 1920, Francis Sumner became the first African American to receive a PhD in psychology. Albert Sidney Beckham, another African American, conducted important early studies on intelligence and its relation to success in various occupations. By and large,

THE MELTING POT: A FACT OF MODERN LIFE

Ethnic and cultural diversity has increased greatly during recent decades in many countries around the world, and the field of psychology has begun to reflect those changes.

however, the history of psychology has, until recently, been the history of a field in which the vast majority of active members were both white and male.

As you can probably guess, this situation has changed radically in the past two decades. At present, women are receiving a majority of the new advanced degrees in psychology. And while the representation of minorities among psychologists has not increased in a similar manner, there is at least a growing **multicultural perspective** within the field: growing attention to the concerns of minority groups, as well as increasing interest in all aspects of cultural diversity (e.g., Smith & Bond, 1993). This interest has taken the form of an increased volume of research on the effects of ethnic and cultural factors on many aspects of behavior. Indeed, there is hardly an area of psychology in which research on such issues is not currently being conducted.

In addition, growing concern with multicultural diversity on the part of psychologists has led to the formulation of guidelines for providing psychological services (for example, counseling) to ethnically and culturally diverse populations (American Psychological Association, 1993). These guidelines note that psychologists must recognize cultural diversity and take full account of it in all their activities. For example, psychologists must provide information to clients in forms and languages that those from different ethnic or cultural groups can understand; they must be certain that psychological tests are valid for use with various cultural groups; and they must recognize ethnicity and culture as important factors in the understanding of psychological processes, including psychological disorders. In short, the guidelines insist that practicing psychologists be sensitive to cultural, ethnic, and linguistic differences, and that they build awareness of these differences into all their professional activities.

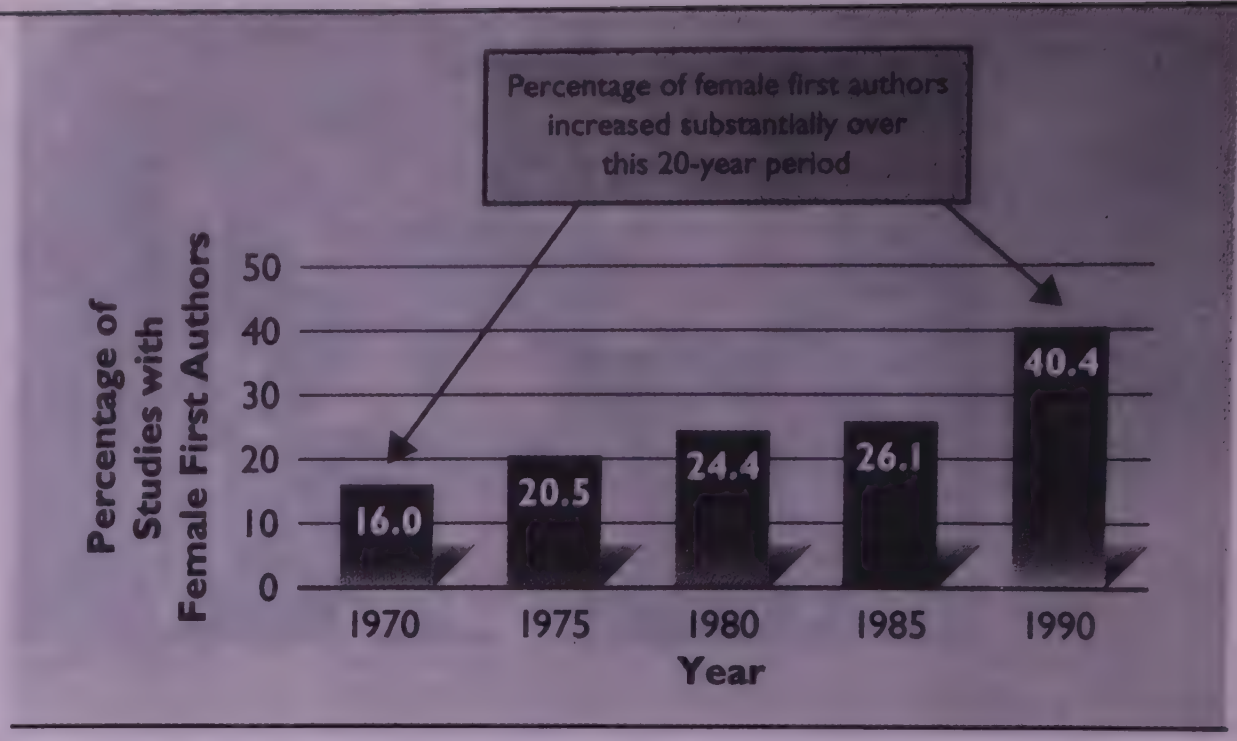
This growing concern with cultural diversity does not imply that the situation is perfect, however—far from it. Recent evidence indicates that although there has been major change, there is still room for improvement. In one recent study, Gannon and her colleagues (1992) examined almost 5,000 articles published in major psychological journals between 1970 and 1990 to determine whether barriers against women had decreased during that period. Some of their results were highly encouraging. For example, as shown in Figure 1.3 on page 14, the proportion of articles in which a female was first author increased dramatically during this period. Similarly, the use of sexist language (for example, using "he" to refer to both males and females) dropped to almost zero during these years. However, there was still some indication of sex bias even in 1990: Sex of participants was not specified

Multicultural Perspective: *In modern psychology, a perspective that takes note of the fact that many aspects of behavior are strongly influenced by factors related to culture and ethnic identity.*

FIGURE 1.3

Women: A Growing Role in Psychology

As shown here, the proportion of articles in major psychological journals authored by women increased substantially between 1970 and 1990.
(*Source*: Based on data from Gannon et al., 1992.)



in some articles, sexist language was used, and findings with one gender were extended to the other in an inappropriate fashion. Approximately 29 percent of the articles published in 1990 showed one or more of these flaws.

Similarly, while there has been increasing research interest in the problems faced by minorities, a recent survey of publications in major psychological journals (Graham, 1992) indicates that the proportion of articles dealing with African Americans peaked in 1972 and decreased substantially after that date. What accounts for this drop? According to Graham, several factors may have played a role, including a reluctance to conduct socially sensitive research (for example, research comparing blacks and whites on various dimensions); the relatively small number of African-American psychologists (African Americans constitute only about 3.4 percent of new PhDs in psychology); and psychologists' growing interest in other topics, such as cognition and the effects of aging. Whatever the reason, it is clear that the volume of research on African Americans and other ethnic or cultural minorities has not kept pace with psychologists' increasing recognition of the importance of such differences. Only time will tell whether this situation will change. A change would appear to be well justified, for as noted by Graham (1992, p. 638): "In contemporary society, most of the population is not white and middle class. Neither should the subject populations in the journals of our discipline continue to be so disproportionately defined."

Psychology: Some Basic Questions

Definitions, it has often been said, are made to be challenged. Given that fact, we'll now consider some of the questions you may have about my suggestion that psychology be viewed as the science of behavior and cognitive processes.

Is Psychology Really Scientific? To start at the beginning, let's address a question I have sometimes heard from students in my own classes: Is psychology really scientific? Even today, some people seem to feel that this is not a science in the same sense as chemistry, physics, or biology. Such reservations may stem mainly from a basic misunderstanding about the meaning of the word *science*.

Some people assume that the term *science* refers to specific fields of study, such as chemistry or physics, and that only these are truly scientific in nature. In fact, the word actually refers mainly to a general approach to acquiring knowledge—one involving the use of certain methods plus adherence to several key values or standards. The methods consist primarily of *systematic observation* and direct *experimentation* and will be described in detail in a later section. The standards involve commitment to such goals as objectivity (evaluating information on the basis of its merits rather than according to one's personal preferences), accuracy (gathering information as carefully and precisely as possible), and skepticism (accepting findings as true only after they have been verified over and over again and all inconsistencies have been resolved).

As you can see, these methods and values are largely independent of the content of any specific field. In fact, they can be used to study a wide range of topics. In determining whether a field is or is not scientific, then, the crucial question is this: Does the field make use of scientific methods and accept scientific values? To the extent it does, it may be viewed as scientific in nature. To the extent it does not, it should be seen as basically nonscientific in its approach. In short, it is the methods and values, not the topics being studied, that are essential.

Given the criteria just described, is psychology really scientific? My answer is a firm *yes*. In their efforts to understand behavior and cognitive processes, psychologists rely heavily on scientific methods and adhere closely to the standards mentioned above. For this reason it is appropriate to define psychology as "the science of behavior and cognitive processes," because in their research psychologists are firmly committed to the scientific method and to the values of science. The topics they seek to study certainly differ from those in older and more traditional fields of science, but the approach they follow is basically the same. And that, as I have already noted, is really the central issue.

Is Psychology Merely Common Sense? In a very real sense, everyone is an amateur psychologist. We all think about our own behavior, and that of other persons, on a regular basis. Because we do, we often feel that we already know the answers to many of the questions studied by psychology, and that we can predict the results of psychological research on this basis. Are such impressions correct? In other words, is psychology merely a rehashing of what our common sense and informal experience already tell us? Before you conclude this is so, consider these two points.

First, if you stop and think about it for a moment, you'll quickly realize that common sense isn't quite as useful a guide to human behavior as you might initially assume. Often it yields contradictory answers about important issues. For example, according to common sense, "absence makes the heart grow fonder" (separation strengthens bonds of affection). But common sense also notes, "out of sight, out of mind" (separation weakens bonds of affection). Can both be true? Perhaps, but common sense doesn't explain why or how. As another example, consider these two statements: "birds of a feather flock together" (similar persons are attracted to one another), and "opposites attract" (dissimilar persons are mutually attracted). Again, we are left with contradictory suggestions. This is where a scientific field like psychology comes into its own. Through systematic research, it can help determine whether any of these commonsense suggestions are true. Going further, it can also find out why such effects occur—why, for example, the more similar two persons are, the more they tend to like each other. (As I'll note in chapter 16, this is actually the case—there's very little support for the view that opposites attract; Smeaton, Byrne, & Murnen, 1989.)

Is Psychology Scientific?

All psychological researchers, regardless of the techniques they use, are firmly committed to the scientific method and to the values of science.

Second, before concluding that many of the findings of psychology are merely common sense, you should consider a phenomenon known as the hindsight, or "I-knew-it-all-along," effect. This refers to our tendency to assume, on learning of some event, that we knew it would happen all along and that therefore it is not all that surprising (Mazursky & Ofir, 1990). Why do we tend to do this? Because doing so puts us in a favorable light in our own eyes. After all, if we perceive that new information is not really very new and that, in fact, we knew it (or at least would have predicted it) all along, this confirms the vast scope of our personal wisdom. In any case, because of the hindsight effect, people often perceive the results of psychological research as something they would have predicted if asked in advance. In fact, however, several studies indicate that when people are asked to predict the results of actual research, they are often dead wrong. So before you decide that the knowledge gathered by psychologists is usually something you really knew all along (or something your grandmother could have told you if you had asked), remember that in such cases, as in many others, hindsight is often a lot better than foresight (Wasserman, Lempert, & Hastie, 1991).

Key Points

- Today, psychologists conduct research on cultural differences and take account of them in providing psychological services.
- Psychology is scientific in nature because it adopts the methods and values of science in its efforts to understand all aspects of behavior.
- Psychology is not mere common sense: The results of systematic research are a much more reliable guide to understanding human behavior than informal observation or the "wisdom of the ages."

Psychology: Who and What

Having defined the field of psychology and addressed some questions about its basic nature, let's turn to two related topics: who psychologists are and what they actually do.

Who: The Background and Training of Psychologists

The terms *psychiatrist* and *psychologist* are quite similar, so it is not surprising that many persons think they mean the same thing. Actually, they refer to

two different groups of professionals. Psychiatrists are physicians who, after completing medical studies, specialize in the treatment of mental disorders. In contrast, psychologists receive their training in graduate programs of psychology, where they earn both a master's degree and, in most cases, a PhD. The latter degree usually requires a minimum of four to five years of study. In addition, psychologists who choose to specialize in certain areas of their field, such as the treatment of psychological disorders, must also complete one or more years of practical experience in a hospital, clinic, school, or business. Throughout their graduate education, psychologists focus mainly on the principles and findings of their field. However, most also complete extensive training in statistics, in research methods, and in related fields such as physiology, sociology, or management sciences.

It should be clear, then, that psychologists and psychiatrists receive different kinds of training. So why are the two fields often confused? In part because many psychologists specialize in the diagnosis, study, and treatment of psychological (mental) disorders. As a result, they focus on many of the same problems and perform many of the same activities as psychiatrists. In fact, members of the two fields often work closely together in the same mental health facilities. Since only some psychologists focus on mental disorders, the two fields overlap only partially and remain largely independent.

Now that we've clarified the difference between psychologists and psychiatrists, here are a few facts about psychologists themselves:

1. The most recent available data indicate that there are now more than 120,000 psychologists in the United States alone (Fowler, 1993).
2. Of these, more than 40 percent are female. This represents a marked increase in the proportion of females; as recently as the 1950s only about 10 percent of all psychologists were women (APA, 1993).
3. As a group, psychologists are relatively young. Almost half received their PhD degree between 1970 and 1979. Thus, most psychologists are in their thirties or forties.
4. More than 3,000 doctoral degrees are awarded in psychology each year (Rosenzweig, 1992).

WHAT: Specialties within Psychology

Before going further, stop and answer the following question: What exactly do psychologists do? If you are like most people, you probably said "conduct therapy," "help people with problems," or perhaps "conduct research." In a sense, the first two replies are not inaccurate, for nearly half of all psychologists are *clinical* or *counseling* psychologists, and they do indeed focus on mental problems and disorders. But there are many other specialties within psychology, so in reality psychologists do many different things and investigate a wide range of topics. Here is a brief description of several of psychology's major subfields:

Clinical Psychology: Studies the diagnosis, causes, and treatment of mental disorders. For example, clinical psychologists have recently devised effective forms of treatment for reducing aggression among highly assaultive children (e.g., Bienert & Schneider, 1993).

Counseling Psychology: Assists individuals in dealing with many personal problems that do not involve psychological disorders. For example, counseling psychologists assist individuals in career planning and in developing more effective interpersonal skills.

Development Psychology: Studies how people change physically, cognitively, and socially over the entire life span. For example, developmental psychologists have found that the patterns of attachment children form to their parents can influence the nature of the romantic relationships they form as adults (Vormbrock, 1993).

Educational Psychology: Studies all aspects of the educational process, from techniques of instruction to learning disabilities. For example, educational psychologists are working to develop classroom procedures designed to help minority children in the United States overcome the environmental disadvantages they face.

Cognitive Psychology: Investigates all aspects of cognition—memory, thinking, reasoning, language, decision making, and so on. For example, cognitive psychologists have recently found evidence suggesting that the reason we can't remember events that happen to us before we are about three years old is that we lack a clearly developed self-concept prior to this age (Howe & Courage, 1993).

Industrial/Organizational Psychology: Studies all aspects of behavior in work settings—selection of employees, evaluation of performance, work motivation, leadership. For example, industrial/organizational psychologists have found that work performance often decreases sharply when employees feel that they are being treated unfairly—that they are receiving fewer benefits than they deserve. Indeed, professional basketball players who feel underpaid actually score fewer points than those who feel that their salaries are fair (Harder, 1992).

Psychobiology (Physiological Psychology): Investigates the biological bases of behavior—the role of biochemical events within our nervous systems and bodies in everything we do, sense, feel, or think. For example, psychobiologists have recently investigated the possible role in gender differences in behavior of subtle differences in the structure of female and male brains (Law, Pellegrino, & Hunt, 1993).

Social Psychology: Studies all aspects of social behavior and social thought—how we think about and interact with others. For example, social psychologists have recently found that while both women and men use *complaints* to change others' behavior, the two genders use this technique in slightly different ways (Klotz & Alicke, 1993).

Experimental Psychology: Studies all aspects of basic psychological processes such as perception, learning, and motivation. For example, research by experimental psychologists has recently added much to our understanding of attention—the process of directing portions of our information-processing capacity to specific stimuli. This knowledge, in turn, is now being applied to the design of more effective warnings about various hazards (e.g., Duffy, Kalsher, & Wogalter, 1993).

KEY POINTS

- Psychologists receive their advance training in graduate departments of psychology. Most receive a PhD after at least five years of advanced study.
- There are many subfields in psychology, including cognitive psychology, developmental psychology, and psychobiology.

The proportion of all psychologists currently working in each of these fields is shown in Figure 1.4. The exact percentages are not crucial; rather, keep in mind two facts: (1) Psychologists do a number of very different things; and (2) despite the existence of many subfields or specialties, psychology remains a unified field with shared values, goals, and overall methods.

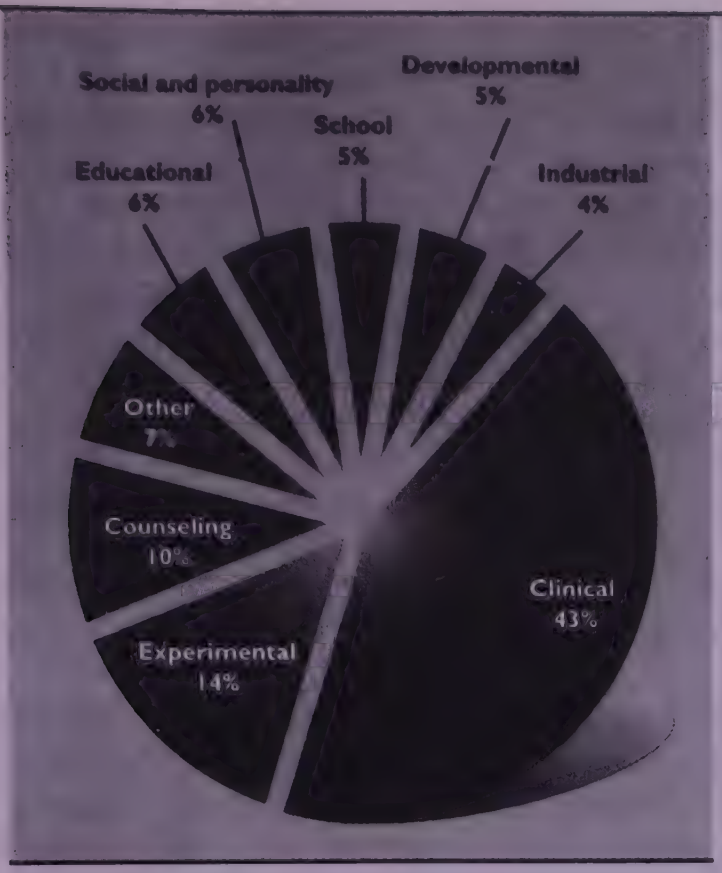


FIGURE 1.4

Subfields of Psychology

Approximate percentages of psychologists working in different subfields or specialties.
(*Source:* Based on membership of divisions of APA given in 1993 *Membership Register.*)

ADDING TO WHAT WE KNOW: *The Process of Psychological Research*

So far in this chapter, I have considered some basic questions about psychology and have indicated why, in my view, it can be defined as a scientific field. Now let's turn to what is perhaps the most important question in this chapter: How do psychologists perform the task of adding to our knowledge about behavior and cognitive processes? How do they move beyond common sense in seeking answers to puzzling questions about human behavior? Psychologists use several different techniques for conducting systematic research. This section will describe the most important of these procedures. The next section will examine some of the complex ethical issues these procedures sometimes raise.

NATURALISTIC OBSERVATION: *Scientists as Explorers*

Almost everyone finds the giant panda of China fascinating. Here, at least in outward appearance, is a teddy bear come to life. For many years zoos throughout the world sought eagerly to add these appealing animals to their collections. Unfortunately, these efforts usually produced disappointing results. The pandas, when finally obtained, seemed to pine away in captivity. Even worse, they adamantly refused to mate, despite the best efforts of the experts and the pandas' keepers. Given the small and declining numbers of pandas present in the wild, these events seemed to spell disaster for a species most people would very much like to preserve. Could anything be done to change this situation? There seemed only one way to find out: observe the

THE GIANT PANDA

In recent years, naturalistic observation has been used effectively to gain valuable information about the habits of the giant panda. This knowledge is crucial if pandas are to be saved from extinction.

pandas in their natural habitat to learn more about their behavior and about what could be done to save them from extinction. In short, this seemed to be a situation in which research should be conducted through **naturalistic observation**—systematic study of behavior in natural settings. Fortunately, efforts along these lines (Schaller, 1986) have added greatly to our knowledge of giant pandas. Scientists have spent months observing the pandas in the mountainous regions of western China where they live and, from such study, have extracted information about pandas' diet and mating habits that may prove useful in assuring their survival.

As this example suggests, naturalistic observation is often used to study animal behavior. However, it is sometimes applied to human beings as well. For example, an ingenious study of this type conducted by Murdoch and Pihl (1988) observed the behavior of male patrons drinking beer or liquor in randomly selected bars. Information on the number of drinks the men consumed and resulting changes in their reactions to others offered intriguing insights into the effects of alcohol on behavior in at least one setting.

I should add that sometimes the data obtained through naturalistic observation are relatively informal, and this can reduce their scientific value. However, the fact that subjects are studied in natural settings and so are likely to act in the ways they normally do is an important advantage that makes this method useful in some contexts.

CASE STUDIES: Generalizing from the Unique

As you already know from your own experience, human beings are unique: Each possesses a distinctive combination of traits, abilities, and characteristics. Given this fact, is it possible to learn anything about human behavior generally from detailed study of one or perhaps a few persons? Several famous figures in the history of psychology have contended that it is. Thus, they have adopted the **case method,** in which detailed information is gathered on specific individuals. For example, Freud based his entire theory of personality on the case method. Is the case method really useful? In the hands of talented researchers such as Freud, it does seem capable of yielding valuable insights about behavior. Moreover, when the behavior involved is very unusual, the case method can be quite revealing. In chapter 6 you'll see how detailed study of several unique cases has added greatly to our understanding of the biological bases of memory. These cases involve individuals who have experienced specific kinds of damage to the brain and, as a result, show certain kinds of memory deficits. By studying the pattern of such memory losses, psychologists have been able to piece together a more complete picture of how memories are stored in the brain (Graf & Schachter, 1985; Squire, 1991). So, despite its obvious drawbacks—for example, the possibility that researchers' emotional attachments to people with whom they work closely for months or even years can reduce their objectivity—the case method does appear to have its uses. When used with considerable caution, it can prove helpful in the investigation of at least some aspects of behavior.

Naturalistic Observation: *A research method in which various aspects of behavior are carefully observed in the settings where such behavior naturally occurs.*

Case Method: *A method of research in which detailed information about individuals is used to develop general principles about behavior.*

Survey Method: *A research method in which large numbers of people answer questions about aspects of their views or their behavior.*

SURVEYS: The Science of Self-Report

You are probably already familiar with another research method often used by psychologists—the **survey method**. This involves asking large numbers of individuals to complete questionnaires designed to yield information on specific aspects of their behavior or attitudes. Such surveys (or polls) are often

conducted to measure a wide range of attitudes and behaviors. Examples include surveys on health care reform in the United States or economic reform in Russia, voting preferences prior to elections, consumer reactions to various products, health practices, and public compliance with safety regulations.

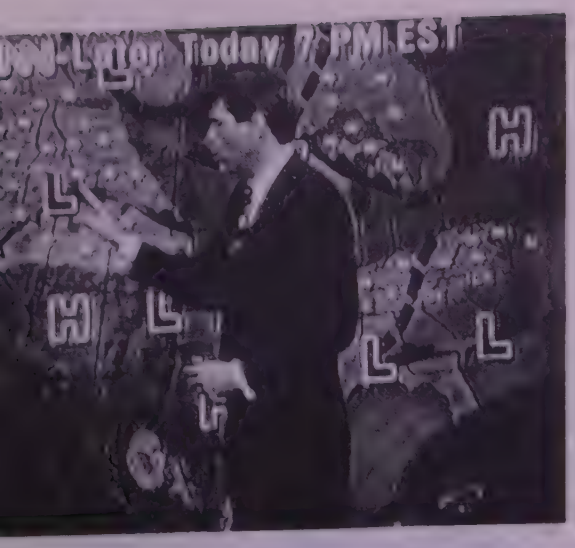
Surveys are often repeated over long periods of time in order to track shifts in public opinions or actual behavior. For example, some surveys of job satisfaction—individuals' attitudes toward their jobs—have continued for several decades. And changing patterns of sexual behavior and sexual attitudes have been tracked by the Kinsey Institute since the 1940s.

The survey method offers some very real advantages. Large amounts of information can be gathered with relative ease, and shifts over time can be readily noted. And when conducted carefully, surveys can provide highly accurate predictions with respect to the outcome of elections and other events. However, the disadvantages are also quite apparent. People may fail to respond accurately or truthfully, providing answers that place them in a favorable light rather than ones that reflect their true views. In addition, the results of surveys are useful only if the persons questioned are truly representative of larger groups to whom the findings are to be generalized. For example, imagine that a survey conducted with 10,000 young men and women indicates that more than 90 percent are strongly in favor of allowing total nudity on public beaches. Should you throw away your bathing suit as an unnecessary nuisance? Perhaps. But not if you learn that all 10,000 persons who responded to the survey are subscribers to a magazine devoted solely to the joys of nudism. The fact that they are raises serious questions about the extent to which they are representative of the larger group to whom we wish to generalize—the entire adult population. The moral is clear: Unless the people who respond to a survey are similar to a larger group to whom we wish to extend the results, such generalizations are on very shaky grounds.

The Correlational Method: Knowledge through Systematic Observation

Prediction—the ability to forecast future events from present ones—is an important goal of science; psychologists, too, often seek to make predictions. Consider, for instance, how useful it would be if we could predict from current information such future outcomes as a person's success in school or various occupations, effectiveness as a parent, length of life span, or likelihood of developing a serious mental disorder. How can this goal be attained? One answer involves efforts to determine whether various aspects of the world (termed *variables* because they can take different values) are related to one another. That is, we try to determine whether changes in one variable are associated with changes in another so that, for example, as one rises, the other does too. The stronger such relationships (*correlations*), the more successfully one variable can be predicted from the other. (The Appendix provides more information about correlations and how they are computed.)

As you already know from your own experience, some events are indeed closely related to others and so can be used as effective predictors of them. For example, meteorologists (scientists who specialize in the prediction of weather) have found that the greater the number of disturbances on the face of the sun (sunspots), the more unsettled the world's weather will be in the coming months in several different respects. Similarly, it has been observed that the greater the number of hours of violent television shows watched by children, the greater their likelihood of behaving aggressively as teenagers (Eron, 1987).



PREDICTION: A KEY SCIENTIFIC PRINCIPLE

Like psychologists, meteorologists rely on the principle of prediction: the fact that information about some variables can be used to predict other variables accurately. How do you use prediction in your own life?

While these examples involve only two variables, you should bear in mind that in many cases accurate predictions can be obtained only when several factors (and the correlations between them) are taken into account at once. For example, if you wish to predict the likelihood that specific persons will rise to positions of leadership in their careers, you will probably have to consider many different factors, including personal characteristics (for example, their interest in serving as leaders as well as their intelligence, flexibility, and persuasiveness); opportunities for leadership in the fields they plan to enter; the needs of the groups they may possibly lead; the potential leaders' gender; and many other variables as well (Mumford et al., in press). How do psychologists use correlations in their research? How do they search for relationships between variables in order to be able to make accurate predictions about important aspects of behavior? Perhaps the best way of illustrating the nature and value of this research approach—known as the **correlational method**—is through an actual example.

THE CORRELATIONAL METHOD: AN EXAMPLE Imagine that a researcher wished to test the following **hypothesis,** an as yet untested prediction about some aspect of behavior: The faster people speak, the more successful they are at persuasion. In other words, the researcher wants to find out whether fast talkers are indeed more convincing than slow ones. How could the investigator proceed? While there are many possibilities, one would be to measure the speed of speech of many would-be persuaders in a wide range of contexts—politics, sales, and so on. In each of these contexts, the researcher would also obtain some measure of the success of the persuaders—for example, the percentage of votes each candidate receives, the amount of merchandise each salesperson sells, and so on. If fast talkers are really more persuasive than slower ones, results might indicate that these two variables (speed and persuasiveness) are positively correlated: The faster candidates and salespersons speak, the greater their success. The researcher would probably also use appropriate statistical procedures (see the Appendix) to measure the strength of this relationship; the stronger the correlation, the more accurately each variable can be predicted from the other. Correlations can range from –1.00 to +1.00; the greater their departure from 0.00, the stronger the relationship between the variables being considered. So if the researcher found a correlation of +0.80 between speed of speech and success in influencing others, this would indicate a stronger link between these two variables than a correlation of +0.30. Similarly, a correlation of –0.60 would indicate a stronger relationship than one of –0.20. In this case, however, the negative sign indicates that the faster people speak, the *less* successful they are at persuasion.

The correlational method offers several major advantages. For one thing, it can be used to study behavior in many real-life settings. For another, it is often highly efficient and can yield a large amount of interesting data in a short time. Moreover, it can be extended to include many different variables at once. Thus, in the simple study described above, information on the physical attractiveness, age, height, and gender of the political candidates, salespersons, and so on might also be obtained. Then these variables could also be related to success in persuasion, to determine if they too influence this outcome. (See the Appendix for further discussion of such procedures.)

Unfortunately, however, the correlational method suffers from one major drawback that lessens its appeal, at least to a degree: *the findings it yields are not conclusive with respect to cause-and-effect relationships.* That is, the fact that two variables are correlated (even highly correlated) does not guarantee that there is a *causal* link between them—that changes in the first cause changes in

Correlational Method: *A research method in which investigators observe two or more variables in order to determine whether changes in one are accompanied by changes in the other.*

Hypothesis: *In psychology, a prediction about behavior that is to be investigated in a research project.*

Observed Relationship	Possible Underlying Cause
(1) The more people weigh, the higher their salaries.	_____
(2) The greater the degree of crowding in cities, the higher the crime rate.	_____
(3) The colder the winter, the greater the number of births the next fall.	_____

Possible answers to Table 1.3: (1) Weight and earnings both increase with age and experience. (2) Crowding and crime are both related to poverty. (3) Cold weather makes people stay indoors and increase their tendency to cuddle—with predictable results.

Table 1.3

Some Correlations That Don't Imply Causation

All of the relationships listed here have actually been observed. However, none indicates that the two factors involved are causally linked. Can you determine why? (Answers are given below the table.)

the second. Rather, in many cases, the fact that two variables tend to rise or fall together simply reflects the fact that both are caused by a third variable.

For example, suppose that our researcher finds a positive correlation between the speed at which politicians talk and the percentage of votes they receive in elections. Does this mean that speed of speech causes voters to prefer certain candidates? Perhaps. But it may also be that fast-talking candidates know more about the issues than slower-talking ones. If this is the case, then the relationship between speed of speech and the outcome of elections is somewhat misleading. Both speed of speech and success at winning elections are actually related to a third factor—knowledge of the issues. Perhaps this key point can be clarified by a few additional examples of correlations that do not indicate causation. These are listed in Table 1.3. Can you identify the third factors that may underlie each relationship shown in the table?

Key Points

- Psychologists use many different research methods, including naturalistic observation, the case method, and the survey approach.
- The correlational method examines relationships between variables.
- The stronger the correlation between two variables, the more accurately one can predict the other. However, correlations *do not* prove causation.

Experimentation: Knowledge through Systematic Intervention

While psychologists use all of the research methods described so far, they often prefer the approach we will now consider: **experimentation** (or *the experimental method*). This involves efforts to determine if variables are related to one another by systematically changing one (or more) and observing the effects of such variations on the other (or others). There are several reasons why psychologists prefer this basic approach, but perhaps the most important is this: In contrast to the other methods we have considered, experimentation yields relatively clear-cut evidence on causality. If systematic variations in one factor produce changes in another (and if additional conditions we'll soon consider are also met), we can conclude with reasonable certainty that there is a causal link between the factors: that changes in one caused changes in the other. Establishing such causality is extremely valuable from the perspective of one major goal of science: *explanation*. Briefly, scientists do not wish merely to describe the world around them and the relationships between different variables or factors in it. They also wish to be able to explain why such relationships exist—why, for example, people find some gauges easier to read than others, why individuals with certain personality traits are more likely than others to suffer heart attacks, why some people gain weight readily while others do not. Experimentation, because it often yields information useful in answering such questions, is frequently the

Experimentation: *A research method where investigators systematically alter one or more variables in order to determine whether such changes will influence some aspect of behavior.*

method of choice in psychology. But bear in mind that there are no hard-and-fast rules in this regard. Rather, most psychologists select the research technique that seems most suited to the topic they wish to study and the resources available to them.

Experimentation: Its Basic Nature Reduced to its bare essentials, the experimental method involves two basic steps: (1) The presence or strength of some variable believed to affect behavior is systematically altered, and (2) the effects of such alterations (if any) are measured. The logic behind these steps is as follows: If the factor varied does indeed influence behavior or cognitive processes, then individuals exposed to different levels or amounts of that factor should differ in terms of their behavior. Thus, exposure to a small amount of the variable should result in one level of behavior, exposure to a larger amount should result in a different level, and so on.

The factor systematically varied by the researcher is termed the **independent variable**, while the aspect of behavior or cognitive processes studied is termed the **dependent variable**. In a simple experiment, then, different groups of participants are exposed to contrasting levels of the independent variable (such as low, moderate, and high). The participants' behavior is then carefully measured to determine whether it does in fact vary with different levels or amount of the independent variable. If it does—and if two other conditions described below are met—the researcher can tentatively conclude that the independent variable does indeed cause changes in the aspect of behavior being studied.

To illustrate the basic nature of experimentation in psychological research, let's return to the question we considered earlier: Are fast talkers more persuasive than slow ones? A researcher who decides to employ the experimental method to study this topic might begin with the hypothesis that the faster people talk (at least up to a point), the more persuasive they are. In such research, the independent variable would be the speed at which would-be persuaders speak, and the dependent variable would be some measure of the persuaders' success in influencing their audiences.

There are many different ways of testing the hypothesis that fast talkers are more persuasive than slow ones, but for the sake of illustration, let's assume that the researcher arranges to have an assistant deliver a speech designed to alter listeners' views on a specific issue: legislation to limit the use of chemicals known to deplete the earth's ozone layer. The speaker would then present this speech to different groups of participants at contrasting speeds. For example, for participants in one group, the speech would be presented at a slow pace (150 words per minute); for those in another group, it would be presented at a moderate pace (170 words per minute); and for those in the third group, it would be presented at a fast pace (190 words per minute). Then some measure of audience members' attitudes toward the legislation would be obtained. If rate of speech does affect persuasion, then results something like those shown in Figure 1.5 might be obtained. As this figure shows, the faster the persuader speaks, the more favorable are the audience members' attitudes toward the pending legislation. We must assume, by the way, that individuals in the three groups start out with similar attitudes toward the legislation; if they do not, serious complications can arise in the interpretation of any results that are obtained. (Actually, several studies have been conducted to investigate the relationship between speed of speech and persuasion. I'll mention the results of these studies below.)

Independent Variable: *The variable that is systematically altered in an experiment.*

Dependent Variable: *The aspect of behavior that is measured in an experiment.*

Experimentation: Two Requirements for Its Success Earlier, we saw that before we can conclude that an independent variable has caused some

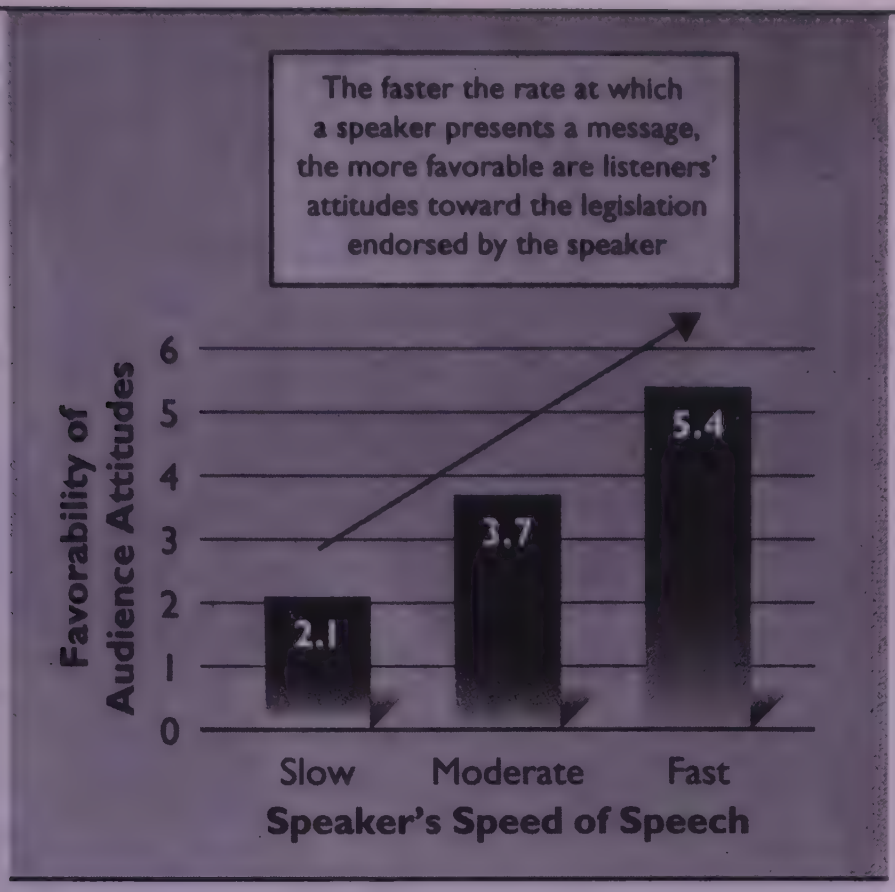


FIGURE 1.5

Results of a Simple Experiment

The results shown here indicate that the faster would-be persuaders speak, the greater their impact on the attitudes of an audience.

change in behavior, two conditions must be met. The first condition involves **random assignment of participants to experimental conditions**. According to the principle of random assignment, all participants in an experiment must have an equal chance of being exposed to each level of the independent variable. The reason for this rule is simple: If participants are *not* randomly assigned to each group, it may later be impossible to determine whether differences in their behavior stem from differences they brought with them, from the impact of the independent variable, or from both. For instance, continuing with our study of speed of speech and persuasion, imagine that participants in the study are drawn from two different groups: first-year law students and a group of high school dropouts enrolled in a special course designed to provide them with basic vocational skills. Now imagine that because of differences in the two groups' schedules, most of the participants exposed to the slow talker are law students, while most of the people exposed to the fast talker are high school dropouts. Suppose that results indicate that participants exposed to the fast talker show much more agreement with the views expressed than participants exposed to the slow talker. What can we conclude? Not much, because it is entirely possible that the difference stems from the different mixes of participants in the two experimental conditions. In the slow-talker condition, 85 percent of the participants are law students and 15 percent are high school dropouts, while in the fast-talker condition, the opposite is true. Since law students may be somewhat harder to persuade than high school dropouts, we can't really tell why these results occurred. Did they derive from differences in the persuaders' rate of speech? From different proportions of the two groups of participants in each condition? Both factors? It's impossible to tell. To avoid such problems, it is crucial that all subjects have an equal chance of being assigned to each experimental group.

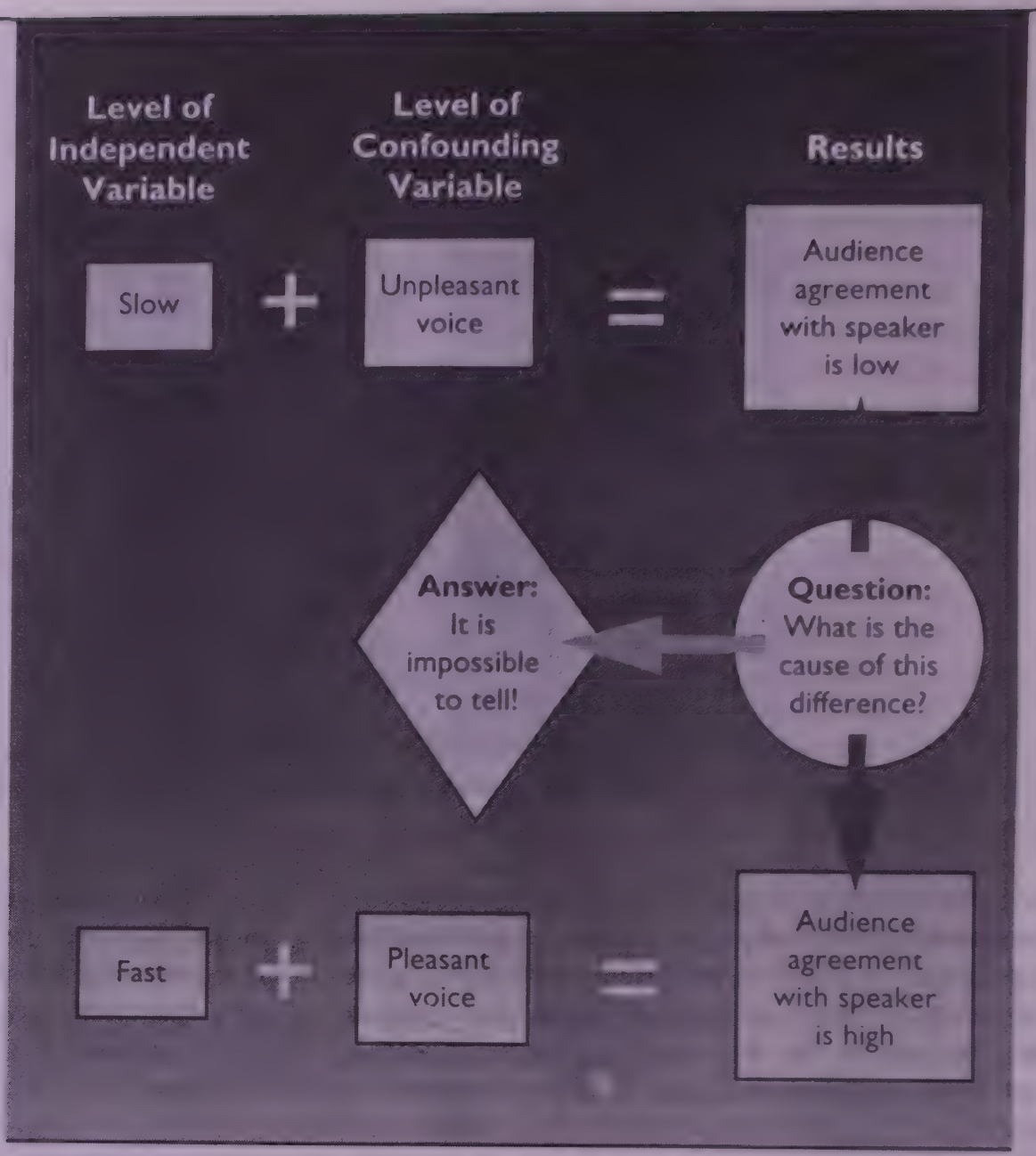
Random Assignment of Participants to Experimental Conditions: *Assuring that all research participants have an equal chance of being assigned to each of the experimental conditions.*

The second condition referred to above may be stated as follows: Insofar as possible, all other factors that might also affect participants' behavior, aside from the independent variable, must be held constant. To see why this is so, consider what will happen if, in the study on speed of speech and persuasion, different speakers are used in the two conditions. Further, imagine

FIGURE 1.6

Confounding of Variables: A Fatal Flaw in Experimentation

In an imaginary study designed to investigate the effects of speed of speech on persuasion, the person who speaks quickly has a pleasant, cultivated voice, while the person who speaks slowly has an irritating voice and unpleasant accent. As a result, two variables—speed of speech and pleasantness of speech—are *confounded*. Because of this fact, it is impossible to interpret the results.



that one of these speakers—the fast talker—has a pleasant, cultivated voice, while the slow talker has an irritating voice and a thick, unpleasant accent. Now assume that participants express greater agreement with the fast talker than the slow one. What is the cause of this result? The difference in the speakers' speed of speech? Differences in the pleasantness of their voices? Both factors? Obviously, it's impossible to tell. In this situation the independent variable of interest (speed of speech) is *confounded* with another variable—pleasantness of the speaker's voice—that is not a planned part of the research. That is, another factor changes as the independent variable changes, so we can't tell whether any effects observed are produced by the independent variable or this other factor. When such confounding occurs, the findings of an experiment are largely uninterpretable. (See Figure 1.6.)

EXPERIMENTER EFFECTS AND DEMAND CHARACTERISTICS: HOW TO GET POSITIVE RESULTS WITHOUT REALLY TRYING Before concluding this discussion of experimentation, we should consider two additional pitfalls lying in wait for careless researchers. The first of these is the risk of **experimenter effects**—the fact that sometimes researchers can influence the behavior of subjects without intending to do so. Such effects can occur in several ways. First, researchers usually have expectations about how participants in their studies may behave. These expectations, in turn, may influence their behavior toward participants and so alter the results obtained. For example, if an experimenter expects fast talkers to be more persuasive than slow ones, she

Experimenter Effects: *Unintentional influence exerted by researchers on research participants.*

may nod or smile at participants when they express agreement with the speaker's views in the fast-speech condition, but show disapproval when they express agreement in the slow-speech condition. The result: Her reactions may influence participants and lead to greater agreement with the speaker's views in the fast-speech than in the slow-speech condition.

A second potential snare for unwary researchers is the fact that experimenters can sometimes communicate the hypothesis behind the study to participants. Once they do, participants' behavior may be affected even if the researchers have no direct contact with them and cannot provide subtle cues of approval and disapproval such as those described above. The effects of such communication are known as **demand characteristics**, since they place subtle demands on participants to "help" the researcher by confirming his or her hypothesis. Research findings indicate that experimenter effects and demand characteristics can both exert powerful effects on participants' behavior. Thus, it is crucial that these effects be minimized in all psychological research. One way of doing this is through a **double-blind procedure**. Here, persons who have contact with participants (often research assistants) are unfamiliar with the hypothesis under investigation and don't know the condition to which participants have been assigned. Under these conditions, they can't readily communicate the hypothesis being studied and can't have clear expectations about how a given participant "should" behave. Another technique for avoiding experimenter effects and demand characteristics is to minimize direct contact between participants and the researcher. This can be accomplished through the use of computerized procedures, in which subjects receive instructions and perform experimental tasks by means of a computer terminal. Through these and related procedures, the impact of several potential pitfalls can be reduced and the validity or accuracy of experimental findings enhanced. For an overview of the correlational and experimental methods of research, please see the **Key Concept** feature (on page 28).

Interpreting Research Results: *Statistics as a Tool*

Once an experiment has been completed, researchers must turn to the next crucial task: interpreting the results. Suppose that in the study we have been discussing throughout this section, results like those in Figure 1.5 are obtained: The faster speakers talk, the more successful they are at persuading listeners. How much confidence can we place in these results? In other words, are the differences observed real ones—ones that would be observed again if the study were repeated with other participants? This is a crucial question, for unless we can be confident that the differences are real, the results really tell us little about human behavior.

One way of dealing with this question, of course, would be to repeat the study over and over again. This would do the trick, but, as you can well imagine, it would be costly in terms of time and effort. Another approach is to use **inferential statistics**. This is a special form of mathematics designed, in part, to evaluate the likelihood that a given pattern of findings, such as differences between experimental groups, is due to chance alone. Thus, to determine whether the findings of a study are indeed real (are unlikely to have occurred by chance alone), psychologists perform appropriate statistical analyses on the data they collect. If these analyses suggest that the likelihood of obtaining the observed findings by chance is low (usually, fewer than five times in a hundred), the results are described as being *significant*. Only then are they interpreted as being of value in the task of understanding some aspect of behavior.

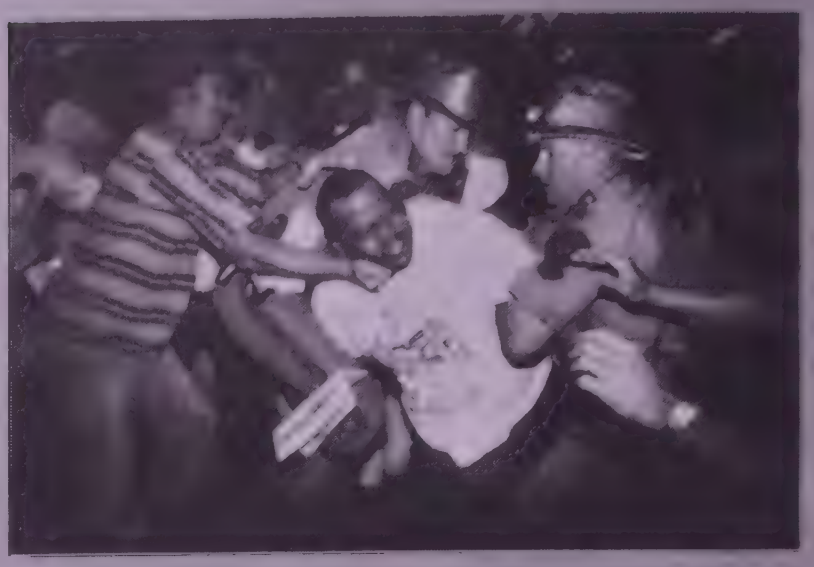
Demand Characteristics: *Implicit pressure on research participants to act in ways consistent with a researcher's expectations.*

Double-Blind Procedure: *Procedure in which neither the persons collecting data nor research participants have knowledge of the experimental conditions to which they have been assigned.*

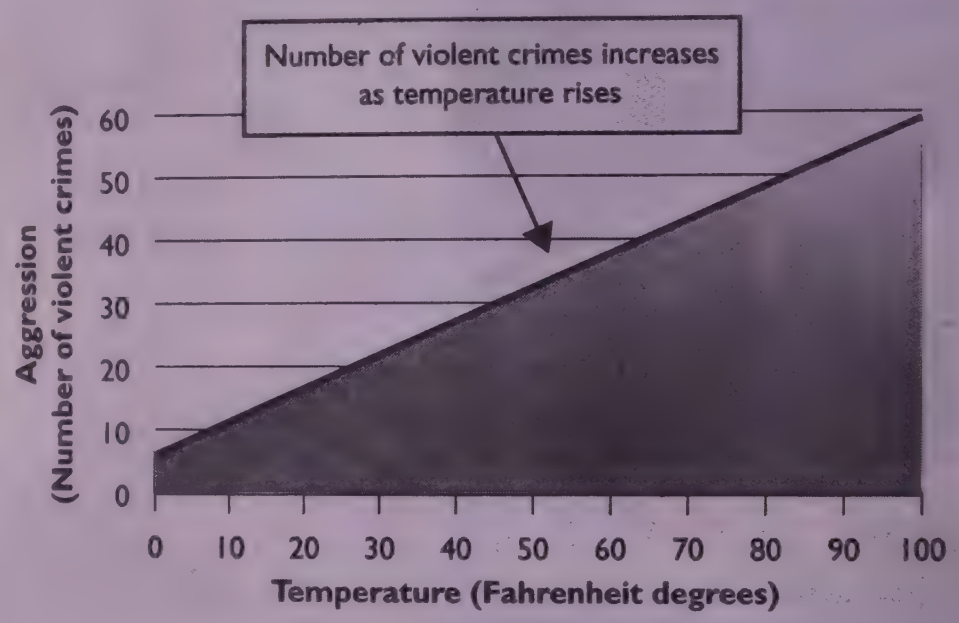
Inferential Statistics: *Statistical procedures that provide information on the probability that an observed event is due to chance.*

KEY CONCEPT

Correlational and Experimental Research Methods



Question: Do people act more aggressively when the temperature goes up?



Correlational Method

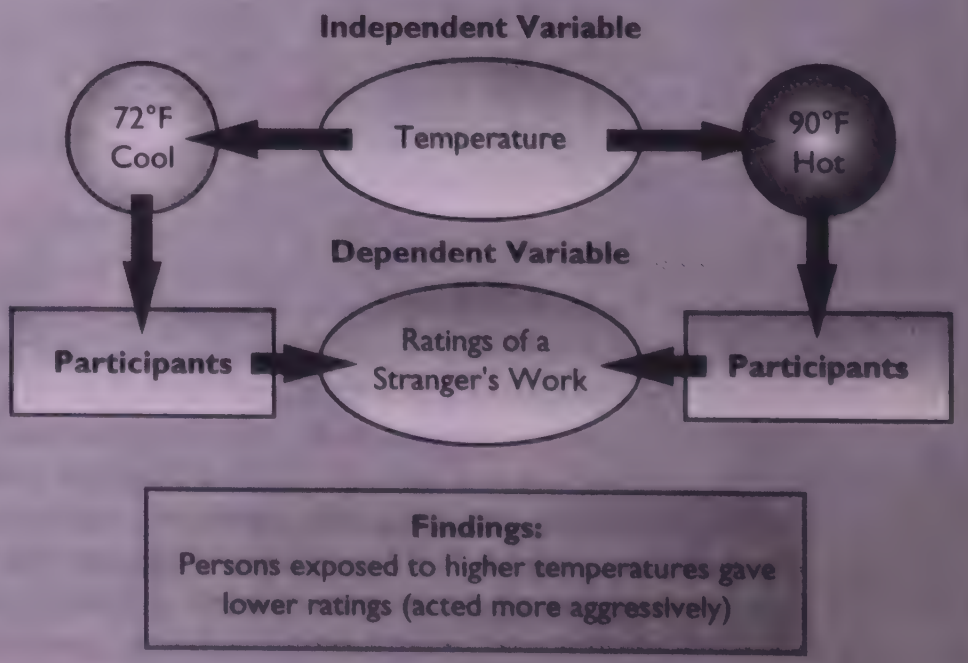
- Records of temperature are obtained for each day for two years in several large cities.
- The number of violent crimes committed on these days is also recorded.
- These two sets of numbers are correlated.

Conclusion: As temperature rises, aggression increases.

Experimental Method

- Participants are exposed to comfortably cool (72°F) or very hot (90°F) conditions.
- After thirty minutes of exposure to one of these conditions, members of each group are given an opportunity to aggress against a stranger by evaluating his or her work. (Poor ratings will prevent this person from being reappointed to a position as a research assistant.)
- Mean ratings assigned to the stranger's work are obtained for the two experimental groups and compared.

Conclusion: Exposure to uncomfortably high temperatures increases aggression. Since temperature was systematically varied, there is some evidence of a causal link between heat and aggression.



Please note: The likelihood that a given pattern of findings is a chance event is never zero. This probability can be very low—for example, one chance in ten thousand or even one chance in a million—but there is always some possibility, however small, that a pattern occurred by chance. For this reason, actual replication of results by different researchers in different laboratories is usually necessary before the findings of any research project can be accepted with confidence, even if statistical analysis indicates that the findings are unlikely to be a chance event. Still, inferential statistics is a valuable tool of tremendous help to psychologists in evaluating research findings.

Meta-Analysis and the Search for an Overall Pattern Before concluding this discussion, I should mention yet one more complexity in the process. Because the results of a single experiment are rarely sufficiently clear to warrant strong conclusions, most hypotheses are subjected to independent tests by many different researchers. When they are, the results are not always consistent. Some studies may find support for a given hypothesis while others do not. For example, imagine that over the years fifty different studies are conducted to examine the effects of speed of speech on persuasion. Of these, thirty-five yield results supporting the hypothesis that the faster people talk, the greater their success in influencing others. However, ten report exactly the opposite findings, and five report no difference in persuasiveness between slow and fast talkers. How can we reach any firm conclusions in this situation? In other words, how can we combine the results obtained by all these studies to determine whether speed of speech really does or does not influence persuasion? In recent years a very powerful technique for doing precisely this has been developed. This technique is known as **meta-analysis** (e.g., Dillard, 1991; Eagly, Makhijani, & Klonsky, 1992) and has gained increasing acceptance among researchers in all areas of psychology. The complex statistical procedures of meta-analysis are far beyond the scope of this discussion. In essence, however, these procedures combine the results of many different studies in order to estimate both the direction and the magnitude of the effects of independent variables of interest. For example, a meta-analysis on the results of the fifty studies on speed of speech and persuasion would combine the findings of all of these investigations in order to determine whether, across all fifty, speed has any effect on persuasion. Meta-analysis is especially useful because it helps to counteract the all-too-human tendency to be strongly influenced by results that are especially interesting or well presented. It utilizes statistical formulas that are free from such influences to combine the results of all available studies. Incidentally, meta-analysis of the many studies that have investigated the effect of speed of speech on persuasion indicate that fast talkers do indeed appear to be more persuasive than slow ones (Smith & Shaffer, 1991).

In sum, because of their commitment to scientific skepticism, psychologists are reluctant to accept the results of any research project—even their own—as valid. Only when the data have been subjected to appropriate mathematical (statistical) analysis and significant effects have been obtained do psychologists view experimental findings as useful in understanding various aspects of behavior. And only when the results of many different studies, combined through meta-analysis, point to specific conclusions, are these accepted as valid and informative.

Meta-Analysis: *Statistical procedures for combining the results of many studies in order to determine whether their findings provide support for specific hypotheses.*

The Role of Theory in Psychological Research

Now that we have considered basic aspects of the research process in psychology, we can turn to a question students often ask: Just how do psycholo-

gists come up with the ideas for all those studies anyway? As you can probably guess, there is no simple answer, for several factors play a role. Some research projects are suggested by informal observation of the world around us. Psychologists take note of some puzzling aspect of behavior or cognition and plan investigations to increase their understanding of them. At other times the idea for a research project is suggested by the findings of earlier studies. Successful experiments do not simply answer questions; they often raise additional ones as well. Thus, the problem facing psychologists is usually not that of coming up with interesting ideas for research. Rather, the difficulty is in choosing among the many intriguing possibilities. Perhaps the most important single basis for research in psychology, however, is formal theories.

Theories represent efforts by scientists in any field to answer the question "Why?" In more formal terms, theories consist of two major parts: (1) basic concepts, and (2) statements concerning relationships between these concepts. Scientists use these parts to generate testable propositions—ones that can be examined in actual research and found to be either true or false. The development of accurate theories is a major goal of all sciences, and psychology is no exception to this rule (Howard, 1985; Popper, 1959). Psychologists, like other scientists, wish not merely to observe or describe the phenomena they study (that is, aspects of behavior); they wish to explain them as well. Thus, a great deal of research in psychology consists of efforts to construct, refine, and test specific theories. Perhaps the best way of illustrating the central role of theory in ongoing research is, again, through a concrete example.

Consider the following: When individuals make a decision, they tend to stick to it even in the face of growing signs that it was wrong. For example, they remain in romantic relationships even after these continue to yield more pain than joy. Or they continue to "throw good money after bad" by repairing an automobile that requires one repair after another. This pattern is sometimes known as "escalation of commitment," and we'll consider it in more detail in chapter 7 (Garland & Newport, 1991).

Certainly, knowing about this tendency is useful in itself. It allows us to predict what may happen in situations where people invest resources or effort in failing courses of action: All things being equal, they will continue to stick to their initial bad decisions. Further, it also suggests the possibility of intervening in some manner to prevent such outcomes. For example, informing people about this tendency to throw good money after bad may prove helpful in lessening its occurrence. These two outcomes—prediction and intervention (or control)—are major goals of science. Knowing about the occurrence of escalation of commitment, however, does not explain why it occurs. It is at this point that theory enters the picture, for as noted above, providing such explanation is its foremost goal.

In fields such as physics or chemistry, theories often take the form of mathematical equations. While this is also true to some extent in psychology, many of the theories we will consider in later chapters involve verbal statements. For example, a theory designed to account for escalation of commitment might state: "When individuals make decisions that result in losses, they are reluctant to admit their mistake, for this admission causes them to 'lose face' (look foolish) in the eyes of others. As a result, they feel they have

KEY POINTS

- Experimentation involves systematically changing one or more variables in order to determine whether changes in these variables affect various aspects of behavior.
- Participants must be randomly assigned to different conditions in an experiment, and confounding of variables must be prevented.
- The results of an experiment can be invalidated by experimenter effects and demand characteristics.
- Theories consist of (1) basic concepts and (2) statements about the relationships between the concepts.
- The results of an experiment are informative only if they are significant; that is, if the probability is low that they occurred by chance alone.
- Meta-analysis can be used to combine the results of many different studies in order to determine whether, when combined, they provide support for a given hypothesis.

Theories: In science, frameworks for explaining various phenomena. Theories consist of two major parts: basic concepts and assertions concerning relationships between these concepts.

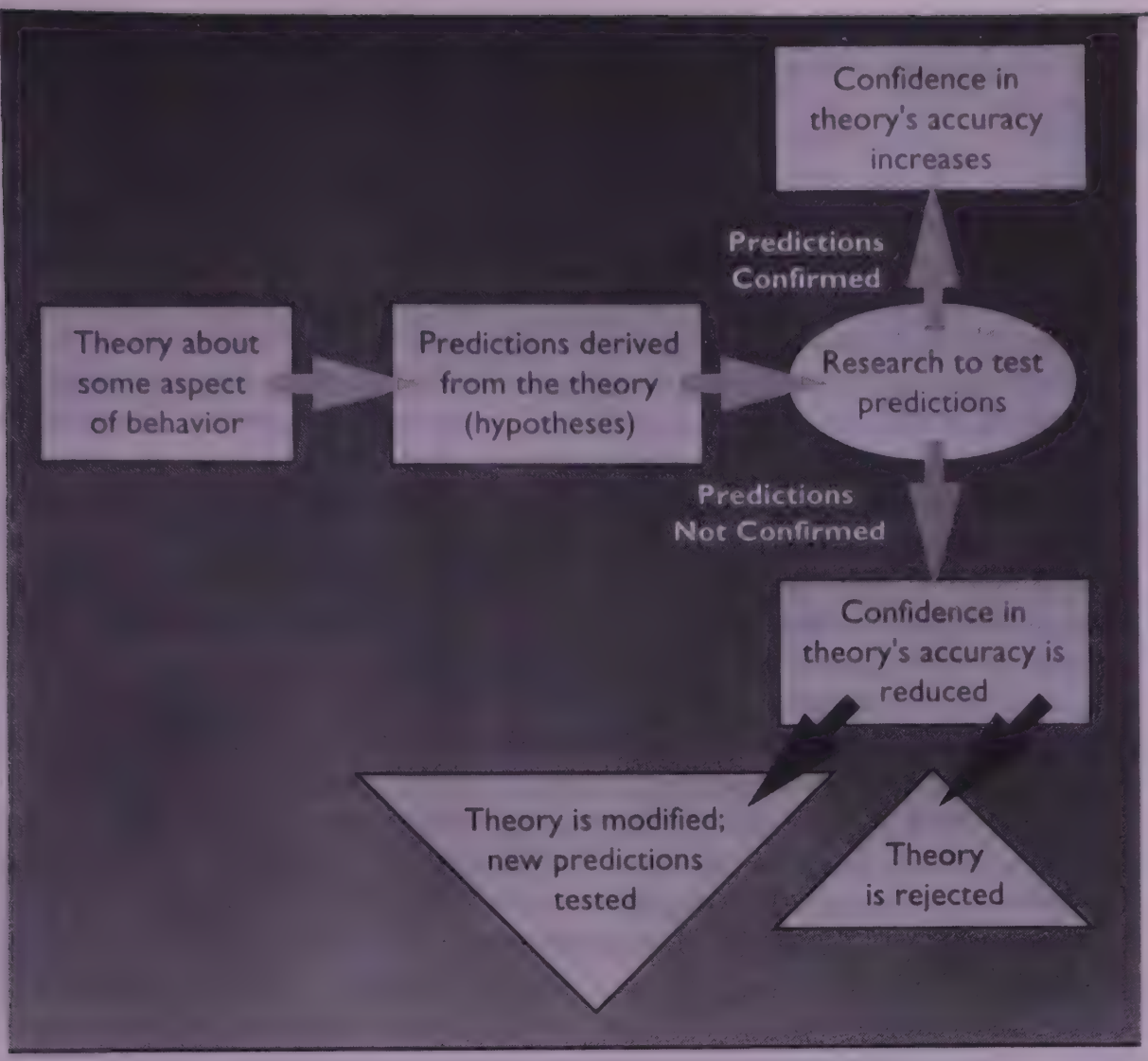


FIGURE 1.7

The Role of Theory in Psychological Research

Once a theory has been formulated, predictions derived from it are tested through research. If these predictions are confirmed, confidence in the theory's accuracy is increased. If they are disconfirmed, confidence in the theory's accuracy is reduced. The theory may then be modified so as to generate new predictions, or, ultimately, be rejected.

no choice but to stick to their original commitment in order to make up for initial losses and so justify their decision." Note that this theory, like all others, consists of the two parts mentioned above: basic concepts (such as losses, pressures to justify past actions) and assertions about the relationships between these concepts (as losses mount, pressures to justify previous decisions intensify).

Once a theory has been formulated, a critical process begins. First, predictions are derived from the theory. These predictions, known as *hypotheses,* are formulated in accordance with basic principles of logic. Then the hypotheses are tested in actual research. If they are confirmed, confidence in the theory's accuracy is increased. If, instead, such predictions are disconfirmed, confidence in the theory's accuracy is reduced. The theory itself may be altered so as to generate new predictions. These are subjected to test and the process continues. If the modified predictions are confirmed, confidence in the revised theory is increased. If they are disconfirmed, the theory may be modified again or, ultimately, rejected. Please see Figure 1.7 for a summary of this process.

It's important to remember that theories are useful only to the extent that they lead to testable predictions. If a theory does not generate hypotheses that can be examined in actual research, it cannot be viewed as scientific in nature.

ETHICAL ISSUES IN PSYCHOLOGICAL RESEARCH

Strange as it may seem, the phrase "psychological research" has an ominous ring for some people. When they hear it, they visualize unsettling

scenes in which all-knowing psychologists somehow force unwary subjects to reveal their deepest secrets and wildest fantasies. Do such concerns have any basis in fact? Is psychological research really harmful to the people and animals who participate in it, and therefore unethical?

While I certainly don't wish to gloss over a complex and serious issue, my answer is a firm *no*. Virtually all psychological research conducted today is performed in accordance with ethical principles acceptable both to society and to science. Indeed, in the United States (the location of more psychological research than any other country), both the federal government and the American Psychological Association have established stringent standards for conducting behavioral research with both humans and animals. These standards seek to guarantee the safety, privacy, and well-being of all research participants and are strictly enforced in universities and other organizations in which research takes place by special review panels called Institutional Review Boards. These boards review all proposed research projects, and such projects can proceed only when final approval is granted. Government agencies and private foundations that fund psychological research will not provide funding for projects until they have received Institutional Review Board approval. Given these safeguards, it seems clear that the frightening picture of psychological research sketched above has little connection to reality.

Despite such precautions, however, two ethical issues deserving of our attention persist. One has to do with the use of deception—withholding information about a study from research participants or, in some cases, giving false information about it. The other has to do with the use of animals in psychological research.

DECEPTION: *Is It Ever Appropriate for Psychologists to Lie to Research Participants?*

Suppose that before becoming involved in a research project, participants were informed that the purpose was to determine how readily they could be influenced by a stranger. Then, suppose they were actually exposed to efforts by another person to change their attitudes or their behavior. Would the study yield any valid results? In all probability, it would not. Having learned that they would soon be exposed to influence, many participants would probably dig in their heels and resist—even if, without this information, they might have yielded. Similarly, imagine that before taking part in a study concerned with willingness to help others in an emergency, participants were informed of this purpose. If they were then exposed to a simulated emergency, could anything be learned about their reactions to such events? Again, probably not, for the knowledge that this aspect of their behavior was being studied might well alter their reactions.

In situations such as these, many psychologists feel that it is appropriate to withhold information about a study from participants, or even to give them misleading information, on a temporary basis. The reason behind such procedures—which are known as **deception**—is straightforward: Researchers believe that if participants have complete information about the purposes and procedures of an investigation, their behavior will be changed from what it would otherwise be and the study will fail to yield any valid new information.

Deception: *Withholding information about a study from participants. Deception is used in situations where the information that is withheld is likely to alter participants' behavior.*

Yet, employing deception raises important ethical issues. Deception, even when temporary, may result in some type of harmful outcome for the persons exposed to it (Kelman, 1967). For example, they may experience discomfort, stress, negative shifts in their self-esteem, or related effects. In addition,

there is the question of whether scientists, committed to the search for knowledge, should place themselves in the position of deceiving persons kind enough to assist them in this undertaking.

Given such possibilities, is it ever appropriate to employ temporary deception in psychological research? I have often faced this question myself, because in many of my own studies, it seemed clear that if participants received full information about the purposes of the research, their behavior would be changed by this information. For example, several of my recent experiments have focused on the question of whether pleasant fragrances can affect people's behavior—for example, influencing their performance on various tasks or, by putting them in a positive mood, thus increasing their willingness to help others (e.g., Baron, 1990; Baron & Bronfen, 1994). In such cases I, like many other psychologists, have concluded that it is appropriate to temporarily withhold some information from research participants. However, this is only acceptable if two important conditions are met: (1) **Informed consent** is employed—before agreeing to take part in a study, subjects must be provided with information about all the events and procedures it will involve and also must be informed that they are free to participate or not participate and can withdraw from the research at any time (American Psychological Association, 1992). (2) Thorough **debriefing** is provided—after the study is over, subjects must be provided with full information about all of its aspects and purposes. Both informed consent and thorough debriefing are required by the ethical standards for conducting behavioral research mentioned earlier, so these are essentially built into the process.

Despite this fact, however, not all psychologists accept the view that deception is sometimes acceptable in research projects (Baumrind, 1985). These critics feel that the use of such procedures reduces participants' faith in science generally, and in psychology in particular, and so jeopardizes continued public support for psychological research. While such arguments cannot be ignored, existing evidence seems to point to more optimistic conclusions. When surveyed, an overwhelming majority of participants report that they view temporary deception as acceptable and do not resent its use (Rogers, 1980; Smith & Richardson, 1985). Further, individuals who have participated in studies involving deception do not report more negative feelings about psychological research, and actually may sometimes report more favorable feelings in this regard (Sharpe, Adair, & Roese, 1992; Smith & Richardson, 1983). Finally, it appears that even relatively brief informed consent forms—ones that do not go into great detail about the procedures of a study—can be quite effective in providing individuals with the information they need in order to decide whether to participate. Indeed, recent findings indicate that relatively brief forms are just as useful in this context as longer and more detailed ones (Mann, 1994). Of course, even in the light of such findings it is unwise to take the safety or suitability of deception for granted (Rubin, 1985). On the contrary, psychologists must always be on guard to protect the rights and well-being of all individuals who, by offering their time, effort, and cooperation, help to advance the frontiers of psychological knowledge.

Informed Consent: *Participants' agreement to take part in a research project after they are provided with information about the nature of such participation.*

Debriefing: *In psychological research, the provision of complete and accurate information about a study to participants after they have taken part in it.*

Research with Animals: Is It Acceptable?

If you were given a tour through the research facilities of any large psychology department, you would soon encounter rooms filled with rats, pigeons, or monkeys, plus equipment used in studying their behavior. At the present time approximately 8 percent of all research projects in psychology are conducted

ANIMAL RESEARCH: THE DEBATE

Research with animals is only a small part of psychological research, but it is invaluable for exploring many topics, including learning, attachment, and social behavior.

with animal subjects—primarily rodents, such as white rats (Beckstead, 1991). There are several compelling reasons for this state of affairs.

First, and probably foremost, it is often impossible (for health or safety reasons) to conduct certain types of research with human participants. For obvious ethical and legal reasons, researchers cannot perform operations on healthy human beings in order to study the role of various parts of their brains in important aspects of behavior. And researchers cannot place human beings on diets lacking in certain nutrients to determine how such deficits influence their learning, or give them addicting drugs to study the neural basis for substance abuse. Under certain conditions, however, it is permissible to employ such procedures with animals.

Other reasons for conducting research with animals include their relatively short life spans, which make investigations of various aspects of development (changes over time) more feasible, and the fact that they can be bred over many generations so as to be genetically homogeneous. Such homogeneity, in turn, makes it easier to investigate the impact of many different variables on behavior, since individual differences relating to genetic factors are minimized. Finally, knowledge of animal behavior can be of great practical value. For example, understanding the behavior of pests can help us to combat them more effectively, perhaps without the use of dangerous chemicals.

In view of these and other important considerations, many psychologists believe that it is appropriate to conduct at least some research projects with animals. Moreover, I should note that most psychological projects conducted with animals involve absolutely no harm or discomfort to the animals; indeed, in many cases they involve such procedures as observing the animals' social interaction with members of their own species or the rate at which they learn to perform various activities. Despite this fact, however, research with animals has generated intense controversy. Supporters of animal rights contend that the procedures employed in research with animals often expose them to harsh or cruel treatment. Most of these protests have been directed against medical research, in which, for example, animals may be injected with lethal microbes or given potentially dangerous drugs. And vigorous objections have been raised against the use of animals in the development and testing of commercial products such as cosmetics. As you might guess, most people find this last type of research especially objectionable—far less acceptable than research in which the results may, potentially, con-

tribute to human health and welfare (Beckstead, 1991). Although psychologists do not typically conduct medical or marketing research, they too have been criticized for exposing animals to dangerous or harmful treatments in their studies of various aspects of behavior.

As you can readily see, this is a complex issue, with no simple solutions. It does seem cruel to expose animals to conditions that are deemed unsafe or unethical for humans. Yet important breakthroughs have often been produced by such research. For example, studies conducted by psychologists with animals have contributed to the development of effective forms of therapy for treating emotional problems, the control of high blood pressure, the reduction of chronic pain, the rehabilitation of persons with neuromuscular disorders (such as disorders that prevent normal walking), and an enhanced understanding of the neural mechanisms underlying memory loss, senility, and various addictions (Miller, 1985).

Do such benefits justify research with animals—even research that exposes subjects to conditions that could not be used with humans? Clearly, this is a value judgment, outside the realm of science. However, many psychologists believe that if every possible precaution is taken to minimize harm or discomfort to subjects, this is a case where the potential benefits do outweigh the very real costs. It is for you as an individual to decide whether—and in what circumstances—you agree.

Ethical Issues in the Practice of Psychology

While psychologists often confront complex ethical issues when conducting research, I would be remiss if I did not mention that they may also face such issues in the normal practice of their profession—when delivering psychological services to clients. Indeed, given that a large majority of psychologists are engaged in applied work rather than in research, the ethical issues they face in such work are probably far more common than the ones described earlier.

A survey of practicing psychologists (Pope & Vetter, 1992) indicates that, as you might well expect, there are many different situations in which ethical issues or dilemmas arise. The most frequent of these center on questions of *confidentiality*—situations in which psychologists receive information from their clients that professional ethics require them to hold confidential, but which they also feel obligated to reveal to legal authorities. For example, one psychologist reported a distressing situation in which a client reported being raped but could not get police to believe her story. Shortly afterward, another client of the same psychologist admitted committing this crime (Pope & Vetter, 1992, p. 399). Clearly, the psychologist in question faced a difficult ethical dilemma. What would *you* do in the same situation? (We don't know what the psychologist ultimately decided to do, because this person chose to keep the decision itself confidential.)

Another frequent cause of ethical concern involves situations in which psychologists find themselves in dual or conflicted relationships with clients. That is, the psychologist's professional role as healer is somehow inconsistent with other relationships he or she may have with a client. For example, one therapist reported an incident in which he sought to file a complaint against very noisy neighbors, only to discover that the owner of the property was one of his

Key Points

- The use of deception in psychological research is controversial, but most researchers agree that it is acceptable provided that certain safeguards are strictly implemented.
- Research with animals raises complex ethical issues and must always involve strenuous efforts to minimize discomfort to the subjects.
- Practicing psychologists also face ethical dilemmas, such as client confidentiality.

CONFIDENTIALITY AND ETHICS

Ethical standards require that psychologists hold in strict confidence information divulged by their clients during therapy. However, what happens when such information involves illegal actions? Should therapists reveal their knowledge to legal authorities? There is no easy or simple answer to such dilemmas.

patients. Considerable ethical concern also centers on sexual issues—instances in which psychologists are attracted to their clients or vice versa. Clearly, the professional role of therapist (and strong guidelines of the American Psychological Association) forbids sexual relationships between therapists and clients; yet such attraction still occurs and can be very distressing to all parties concerned.

These are just a few of the ethical dilemmas and problems faced by psychologists in their efforts to assist individuals. Many others, ranging from concerns over providing expert testimony in criminal trials through the use of advertising to build one's practice, exist as well. In short, efforts to help individuals cope with life problems and psychological disorders raise many ethical issues and require adherence to the highest professional standards. Truly, then, working as a psychologist can be a demanding job.

USING THIS BOOK: A Note on Its Features

Are all textbooks alike? I don't believe so. Rather, I feel that textbooks, like individuals, are all unique and reflect the experience, perspectives, and goals of their authors. I've already mentioned my goals for this book: providing you with a broad yet integrated overview of the findings of modern psychology, *and* calling your attention to how you, personally, can benefit from this knowledge. In order to reach these goals, I've incorporated a number of special features into this book. In keeping with my earlier comments about "mental frameworks," I'll describe these briefly here so that you'll have a better idea of what's coming and an awareness of how to make maximum use of these features.

First, I've taken several steps to make the text easier to read and more convenient to use. Each chapter begins with an outline and ends with a summary. Within the text, key terms are printed in **dark type like this** and are

accompanied by a definition. These terms are also defined in a running marginal glossary, as well as in a glossary at the end of the book. In addition, important principles that lie at the heart of the field of psychology are highlighted under the heading **Key Points**. If you understand and retain these, you will be off to a very good start in your efforts to profit from this first course in psychology. All figures and tables are as clear as possible, and most contain special labels and notes designed to help you interpret them. Finally, to help you understand concepts that many students find difficult to grasp, special **Key Concept** pages illustrate these ideas in an attractive format.

Second, in keeping with the theme of **Making Psychology Part of Your Life**, I've included numerous references to my *own* life—instances in which I, personally, made use of the principles and findings of psychology. I believe that these references will get you thinking about ways in which the topics and materials discussed are relevant to your own experiences, so please watch for them throughout the book.

Third, this text includes several types of special sections I think you'll find both interesting and informative. One type is labeled **The Research Process**. Such sections provide discussions of active lines of research in psychology—current efforts by psychologists to understand specific aspects of behavior. They are designed to help you understand how research actually unfolds in psychology, and to provide you with practice in critical thinking. A second type of special section is labeled **The Point of It All**. These sections seek to accomplish two goals. First, they will help you to see the "big picture"—to understand why specific topics are important and why psychs are interested in them. Second, they describe actual ways in which the findings and principles of psychology are currently used to solve a wide range of practical problems. All chapters conclude with a section entitled **Making Psychology Part of Your Life**. These sections indicate how you personally can apply the information presented to enhance your own life. Finally, because of psychology's growing concern with the role of cultural and ethnic diversity, all chapters contain special sections entitled **Perspectives on Diversity**. These sections examine the impact of ethnic and cultural factors on many aspects of behavior and, I believe, will bring psychology's commitment to a multicultural perspective firmly into focus.

I hope that these and other features of this text will help you to understand psychology—and help me share with you my excitement about this field. In any case, may your first contact with psychology be as stimulating, enjoyable, and beneficial as mine was many years ago.

Using the Knowledge in This Book: Some Tips on How to Study

Three topics that have long been of major interest to psychologists are learning, memory, and motivation. (We'll consider them in detail in chapters 5, 6, and 10.) Indeed, all three can probably be listed among the topics about which psychology currently knows most. From your perspective as a college student, this is a positive state of affairs, for all three are closely related to one activity you must perform—and perform well—as a college student: studying. After all, you must be motivated to study, must learn new materials, and must remember them accurately in order to succeed. Knowledge gained by psychologists can be very useful to you in accomplishing these tasks. In this

section I'll draw on existing knowledge about learning, memory, and motivation in order to offer some concrete tips on how you can get the most out of the time you spend studying.

1. *Begin with an overview.* Research on memory indicates that it is easier to retain information if it can be placed within a cognitive framework—in other words, if it is clear how different pieces of information or topics relate to one another. So when you begin to study, it is very helpful to start with an overview. Examine the outline provided at the start of each chapter and thumb through the chapter itself once or twice. That way, you'll know what to expect and will already have an initial framework for holding the information in mind when you get down to more serious studying.

2. *Eliminate (or at least minimize) distractions.* In order for information to be entered into memory accurately, close attention to such input is necessary; it won't make sense or flow into your mind unless you focus on it. This implies that you should take care to avoid distractions—stimuli or events that will disrupt your attention and cause you to focus on something other than your studying. So when you get down to serious studying, try to do it in a quiet, secluded place. Turn off the television or radio, put those magazines out of sight, and unhook your telephone. You may find this hard to do, but remember: If you don't eliminate distractions, it will take you longer to cover the same ground. And where studying is concerned, efficiency—covering the most you can in the shortest period of time—is a key goal.

3. *Recognize the limitations of your own span of concentration.* Students sometimes tell me that they have studied for one of their exams "for eight hours without a break." Perhaps; but I know that I couldn't study that long without stopping. We are, after all, human; and this means that we get hungry or bored after performing one activity for a long time. How long should you study without taking a break? People differ greatly on this dimension. However, it is important to recognize your own span of concentration and to avoid exceeding it. Yes, you should certainly try to stretch it a bit: this kind of self-discipline can help you increase the length of your study sessions. But no, you should not try to study for many hours without a break. Your learning efficiency will decrease, and you will get diminishing returns from forcing yourself to continue well beyond your own personal limits.

4. *Set specific, challenging, but attainable goals for your studying.* Industrial/organizational psychologists have long been concerned with the topic of work motivation—willingness to expend effort on various tasks (Locke & Latham, 1990). One of the key findings of their research is that setting certain kinds of goals can help greatly in this regard. When individuals set specific goals, ones that are challenging yet attainable, both motivation and task performance often increase. What does this mean with respect to studying? First, that you should set concrete goals for each session—for example, "I'll read twenty pages and review my class notes," or "I'll read an entire chapter." Merely telling yourself "I'll do as much as I can" is far less effective. Second, you should set challenging but feasible goals. If you know that you can't sit still for more than an hour, then it is silly to set as a goal "I'll read two chapters." You simply won't be able to do so before you get restless and can't continue. It is much more effective to set somewhat difficult goals that you can, with effort, attain. Such goals are within your reach, and you can experience a sense of accomplishment when you attain them. So begin by setting appropriate goals; you will almost certainly increase your motivation!

5. *Reward yourself for progress.* As you'll see in chapter 5, people often perform various activities to attain external rewards, ones administered to them by others. But in many cases we provide our own rewards. We pat ourselves on the back for accomplishments, eat a favorite dessert as a reward for dieting successfully all week, and so on. You can put this process to good use where studying is concerned. Studying is certainly hard work. So, after completing an assignment or reaching one of your self-set goals, you should definitely give yourself a reward. What rewards should you select? This depends on what you like. The basic rules are simply these: (a) Provide yourself with something you enjoy, whatever that may be; and (b) do so only after you have completed your studying and reached the goals you set.

6. *Engage in active, not passive, studying.* As you probably know, it is quite possible to sit in front of a book or set of notes for hours without accomplishing much—except daydreaming. And even when you keep your mind on what you read, it is difficult to remember it if all you do is follow the printed words. Many studies on memory and related aspects of cognition suggest that in order truly to master new information, we must do more than merely be exposed to it. We must also think about it, relate it to information we already know, ask questions about it, and so on (Baddeley, 1990; Craik & Tulving, 1975). With respect to studying, this implies that when you read new material, you should think actively about it as you progress. Ask questions about it, try to generate examples of the principles or concepts covered, and relate the material to what you already know. Taking notes on key points and reviewing these later can also be helpful. (This is one reason why I have included the **Key Points** feature in this text.) Finally, you should actively review your notes and the material, quizzing yourself in various ways.

Following these guidelines sounds like a lot of effort. But doing so can greatly increase the effectiveness with which you study. Moreover, once you gain practice with these procedures and form good study habits, the whole process will tend to get easier. The ultimate result, then, will be that you learn and remember more information in shorter periods of time. Certainly, reaching that outcome is well worth the effort.

IMPROVING YOUR STUDY SKILLS: HOW PSYCHOLOGY CAN HELP

Research findings in the areas of learning, memory, and motivation can help you become a more effective learner.

Making Psychology Part of Your Life

Practice in Critical Thinking: The Hidden Bonus in Introductory Psychology

If I asked a large group of students to indicate why they had enrolled in introductory psychology, I'd obtain a wide range of answers. Among the most common, though, would be replies such as these: "I wanted to know more about people," "I want to know more about myself," "I thought it would be interesting." In other words, most would indicate that they enrolled in the course because of its content. They expected to learn a lot of interesting facts about people—things they didn't know before taking the course.

Such expectations are fully warranted; you will acquire a great deal of intriguing information about behavior and cognitive processes from this book and from your course. Yet there is another major benefit you will derive from your first exposure to psychology—one that is often overlooked. In a phrase, not only will you acquire facts about psychology, you will also learn to think critically about human behavior. To illustrate this hidden value of introductory psychology, we must first define the term *critical thinking* (Paul, 1990).

First, let's note what critical thinking is not. Critical thinking does not mean negative, fault-finding, nit-picking thinking. It does not imply an automatic rejection of all arguments, hypotheses, or theories. What it does involve is the ability to cast a skeptical mental eye on claims, assertions, and arguments until they are carefully assessed and objectively examined. In other words, critical thinking means the ability to resist being stampeded, emotionally or otherwise, into accepting statements or arguments that are not actually supported by the facts. (See Table 1.4 for a summary of key aspects of critical thinking.)

For example, suppose that one day you pick up a newspaper and notice the following headline: "Personality Flaws Keep People from Promotion." You read on and learn that according to a management "expert," people who demonstrate certain personal characteristics—such as constant complaining, being a loner, or being arrogant and overconfident—don't get promotions. "More people lose jobs or promotions because of personality problems than from an inability to do the work," states the expert. How

TABLE 1.4

Critical Thinking: Some Basic Components

Critical thinking involves considerable cognitive effort. However, since it can help you avoid serious errors of judgment, bad decisions, and many other pitfalls, it is a skill well worth developing.

ASPECT	VALUE/PURPOSE
Define the issue or problem clearly, including key terms.	You can't think clearly about an issue unless you know just what it involves.
Examine all relevant evidence; avoid jumping to premature conclusions.	Avoid the temptation to go with "gut-level feelings." Better decisions and judgments can be made if all available evidence is taken into account.
Carefully consider assumptions and biases.	All arguments are based on assumptions. These must be brought out into the open so you can determine their validity.
Avoid the tendency to oversimplify.	Simple answers or solutions are very misleading and ignore important complexities.
Avoid the tendency to overgeneralize.	Avoid leaping from a single event or experience to all related events or experiences.

should you react to these claims? Your first reactions may be, "Hmm . . . that makes sense. I'd better watch out for these problems in my own behavior." If you stop and think more carefully, however, you may ask questions such as these: How does the expert know that these things keep people from getting promotions? What data did he or she collect? How do you measure complaining, being a loner, or being overconfident? What kind of jobs were involved? Are these traits really the ones that matter most? In other words, you would approach the whole issue with a healthy degree of skepticism—and reserve judgment until you have better answers to your questions.

But what, specifically, does introductory psychology have to do with development of the capacity for critical thinking? In fact, a great deal. First, such critical thinking is part and parcel of the scientific approach in our field. Time and time again in this text, we'll consider instances in which common sense suggests a simple answer to an important question about behavior—an answer which is then shown to be false by systematic research. In the absence of science-based critical thinking, the commonsense conclusion, false as it is, might well persist. Indeed, the question of its accuracy might never even be raised. Therefore, many examples of critical, scientific thinking will appear in later chapters.

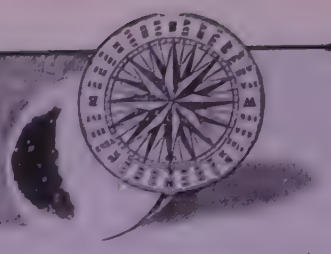
Second, discussions of such topics as memory, decision making, problem solving, and creativity will provide you with new insights into these important processes—and especially with insights into the many forms of bias and error that can affect them. Realizing that your memory can indeed play tricks on you and that your decisions can be influenced by many forms of bias will help alert you to these potential problems. And as one old saying goes, "Forewarned is forearmed."

Third, and perhaps most important, exposure to psychology will provide you with experience in thinking critically about behavior. My experience tells me that many persons who are quite capable of thinking clearly and critically about the physical world lapse into far less careful and sophisticated patterns of thought when they contemplate their own feelings, others' behavior, or their social relationships. As you'll see throughout this book, critical thinking can be applied to virtually any topic—including all aspects of behavior. Thus, once you become proficient at it, you can apply it to almost any situation or question you encounter in later life.

As you will see, your first course in psychology will provide you with much practice in critical thinking. And this is definitely a skill you will take with you—and use—long after the course, and this book, are just memories of days long past.

The ability to avoid believing everything you read is one important aspect of critical thinking.

Summary and Review of Key Points



Psychology: What It Is and How It Developed

Key Terms:

critical thinking, p. 3
psychology, p. 3
structuralism, p. 5
functionalism, p. 5
behaviorism, p. 5
cognitive processes, p. 8
psychodynamic perspective, p. 8
humanistic perspective, p. 9
evolutionary psychology, p. 10
multicultural perspective, p. 13

- *Psychology* is defined as the science of behavior and cognitive processes.
- Psychology studies behavior from many different perspectives: behavioral, cognitive, psychodynamic, humanistic, biopsychological, evolutionary, and sociocultural.
- Early psychologists differed sharply over the scope of their new field. Structuralists felt that it should identify the basic parts of consciousness. Functionalists believed that psychology should focus on the adaptive value of the human mind. Behaviorists felt that psychology should focus primarily on observable behavior.
- Until recently, the field of psychology did not focus much attention on cultural or ethnic differences. However, this situation has changed greatly, and such differences are the focus of an increasing amount of research attention.
- Psychology is scientific in nature because it adopts the methods and values of science in its efforts to understand behavior. Psychology is not mere common sense: The results of systematic research are a much more reliable guide to understanding human behavior than is informal observation.

Psychology: Who and What

- Psychologists receive their advanced training in graduate departments of psychology. Most receive a PhD after at least five years of advanced study.
- There are many subfields in psychology, including cognitive psychology, developmental psychology, and psychobiology. All share a commitment to advancing our knowledge of behavior through scientific means.

Adding to What We Know: The Process of Psychological Research

Key Terms:

naturalistic observation, p. 20
case method, p. 20
survey method, p. 20
correlational method, p. 22
hypothesis, p. 22
experimentation, p. 23
independent variable, p. 24
dependent variable, p. 24
random assignment of participants to experimental conditions, p. 25
experimenter effects, p. 26
demand characteristics, p. 27
double-blind procedure, p. 27

- Psychologists use many different research methods, including naturalistic observation, the case method, and the survey approach.
- In the correlational method of research, efforts are made to determine whether relationships (correlations) exist between variables—that is, whether changes in one variable are accompanied by changes in another.
- The stronger the correlation between two variables, the more accurately one can be predicted from the other. However, even strong correlations do not indicate that changes in one variable cause changes in another.
- Experimentation involves systematically altering one or more variables in order to determine whether changes in these variables affect behavior.
- The results of an experiment are valid only to the extent that participants are randomly assigned to conditions and confounding of the independent variable with other factors is prevented.
- Research results can also be invalidated by subtle cues that reveal a researcher's expectations about participants' behavior (experimenter effects) or that reveal the hypothesis of the study to participants (demand characteristics).
- The results of an experiment are informative only if they are significant: that is, if the probability is low that they occurred by chance.
- Combining and evaluating the results of many different studies through meta-analysis can help researchers determine whether the studies provide support for a specific hypothesis.

inferential statistics, p. 27 meta-analysis, p. 29 theories, p. 30	• Theories consist of (1) basic concepts and (2) statements concerning relationships between these concepts. They are frameworks designed to help explain various aspects of the natural world. Only theories that can be tested and confirmed (or perhaps disconfirmed) are scientifically useful.
Ethical Issues in Psychological Research Key Terms: deception, p. 32 informed consent, p. 33 debriefing, p. 33	• In some cases, psychologists withhold information about a study from participants. This kind of deception is used when the withheld information might change participants' behavior from what it would normally be. • Research with animals raises complex ethical issues and must always involve strenuous efforts to minimize discomfort or risk to the subjects. • Psychologists also face many complex ethical issues with respect to the practice of their field—for example, assuring confidentiality of sensitive information for persons receiving therapy.

Critical Thinking Questions

Appraisal	Most psychologists view their field as being scientific in nature. Do you agree? Explain why you accept or reject this view.
Controversy	Research with animals is a very controversial topic. Some people believe that it is never appropriate to conduct such research, while others feel that such research is often justified. What are your views on this issue? Is research with animals ever justified? If so, when? If not, why?
Making Psychology Part of Your Life	Now that you know the basic ground rules of psychological research, do you think this knowledge will lead you to evaluate claims about human behavior differently than in the past? Think of one statement about people you have read in newspapers or magazines or heard on television in recent days; in the light of appropriate research methods, do you think it is accurate?

Biological Bases of Behavior:

A Look Beneath the Surface

2

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- Neurons: Their Basic Function
- Neurotransmitters: Chemical Keys to the Nervous System

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Congress declared the 1990s the "decade of the brain." Why? In part, to recognize the tremendous progress scientists have made toward unlocking the human brain's many secrets. Rapid advancements in technology have enabled researchers to look inside the nervous system of living people to discover important relationships between structures and functions of the brain and behavior. Although such advances would have been viewed as science fiction only a generation ago, today they are a reality. Moreover, exciting new discoveries in this area continue

THE "DECADE OF THE BRAIN"

Although scientists have not yet succeeded in constructing the thinking cap of Calvin's active imagination, they are making great strides toward understanding the biological bases of behavior.

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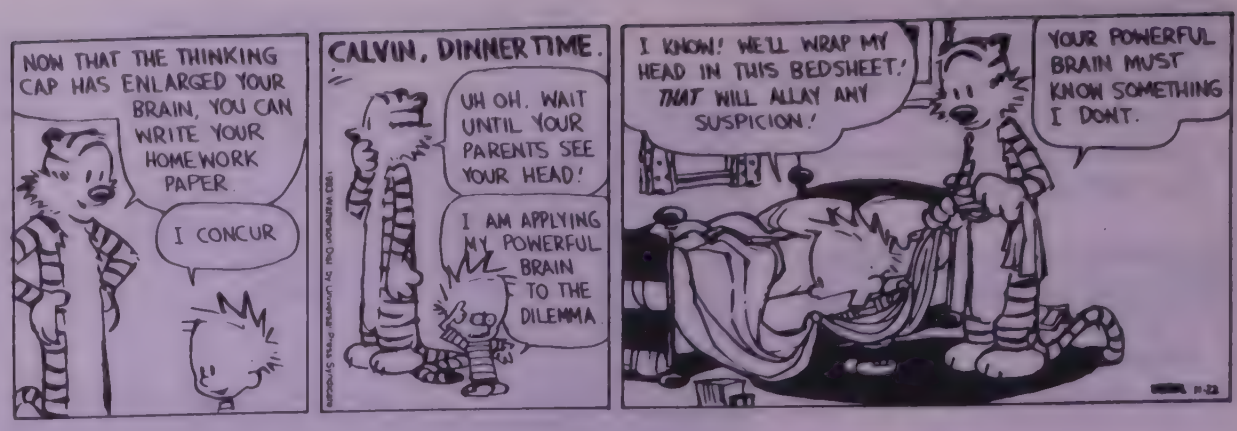


to occur at an astonishing pace. As we proceed through this chapter, you'll see that the 1990s are, indeed, an exciting period in the history of psychology.

Scientific study dedicated to unlocking the mysteries of biology and behavior is called **biopsychology** (Pinel, 1993). This term is appropriate because it accurately reflects the very broad scope of current efforts to understand how important aspects of behavior and cognition are related to complex biological processes. For example, perhaps you have wondered about such questions as these: What happens inside our bodies when we experience joy, anger, or sexual desire? How can our brains store memories of events that took place years or even decades ago? What happens when we dream? Make plans? Imagine future events or outcomes? How is our sexual orientation determined? Clearly, all these activities must be related to biological events within our bodies; but what, precisely, are these events? Biopsychologists, too, are deeply interested in such questions. And although they do not yet have all the answers, they are making tremendous progress toward answering many important questions in this decade of the brain.

CONGRESS DECLARED THE 1990S THE "DECADE OF THE BRAIN."

Biopsychologists also recognize that the brain does not exist in isolation, but rather performs in concert with elements of our physical and social environment. Armed with the tools of modern technology, scientists are now discovering how biological processes interact with environmental factors to determine how we think, feel, and behave—sometimes, but not always, for the best, as we'll see later in this chapter. Fortunately, a rapidly growing body of evidence suggests that environmental factors can sometimes offset the effects of nature. Thus, while biological factors are powerful, they are not immutable.

We'll begin our discussion of biopsychology by examining the structure and function of neurons, the building blocks of the nervous system. As you'll soon see, understanding how neurons function—and especially how they communicate with one another—provides important insights into such diverse topics as how drugs exert their effects and how, perhaps, serious forms of mental illness develop. Next, we will turn to the structure and function of the nervous system, devoting special attention to the brain, the marvelous organ that is ultimately responsible for consciousness—and for the fact that you are now reading and understanding these words! Discussion of the structure and function of the brain will lead us to several fascinating topics, including the biological basis of addictions and the surprising fact that the two sides of the brain are actually specialized for the performance of somewhat different tasks. Recent research on the first of these topics offers important new insights into the nature of addiction to many drugs, including alcohol. After this, we will turn briefly to the endocrine system, internal glands regulated by the nervous system that play an important role in key

Biopsychology: *The branch of psychology concerned with discovering the biological bases of our thoughts, feelings, and behaviors.*

aspects of behavior. We'll conclude our discussion by reviewing recent evidence regarding the role of genetic factors in determining several important aspects of human behavior, physical and mental disorders, and even sexual orientation.

NEURONS: Building Blocks of the Nervous System

Why do the words "It's time for supper!" produce rumbles in our stomachs, strong feelings of hunger, and a dash to the dinner table? In other words, how can information reaching our ears produce bodily reactions, sensations of hunger, and overt actions relating to these? The answer involves the activity of **neurons**—cells within our bodies that are specialized for the tasks of receiving, moving, and processing information.

NEURONS: Their Basic Structure

Neurons are tremendously varied in appearance. Yet most consist of three basic parts: (1) a *cell body*, (2) an *axon*, and (3) one or more *dendrites*. **Dendrites** carry information toward the cell body, whereas **axons** carry information away from it. Thus, in a sense, neurons are one-way channels of communication. Information usually moves from dendrites or the cell body toward the axon and then outward along this structure. A simplified diagram of a neuron and actual neurons are shown, magnified. in Figure 2.1 (on page 48).

In many neurons the axon is covered by a sheath of fatty material known as *myelin*. The myelin sheath (fatty wrapping) is interrupted by small gaps. Both the sheath and the gaps in it play an important role in the neuron's ability to transmit information, a process we'll consider in detail shortly. The myelin sheath is actually produced by another basic set of building blocks within the nervous system, **glial cells**. Glial cells, which outnumber neurons by about ten to one, form the myelin sheath by sending out parts that wrap around axons.

Near its end, the axon divides into several small branches. These, in turn, end in round structures known as **axon terminals** that closely approach, but do not actually touch, other cells (other neurons, muscle cells, or gland cells). The region at which the axon terminals of a neuron closely approach other cells is known as the **synapse**. The manner in which neurons communicate with other cells across this tiny space is described below.

Neurons: *Cells specialized for communicating information, the basic building blocks of the nervous system.*

Dendrites: *The parts of neurons that conduct the action potential toward the cell body.*

Axons: *The parts of the neurons that conduct action potential away from the cell body.*

Glial Cells: *Cells in the nervous system that surround, support, and protect neurons.*

Axon Terminals: *Structures at the end of axons that contain transmitter substances.*

Synapse: *A region where the axon of one neuron closely approaches other neurons or the cell membrane of other types of cells such as muscle cells.*

NEURONS: Their Basic Function

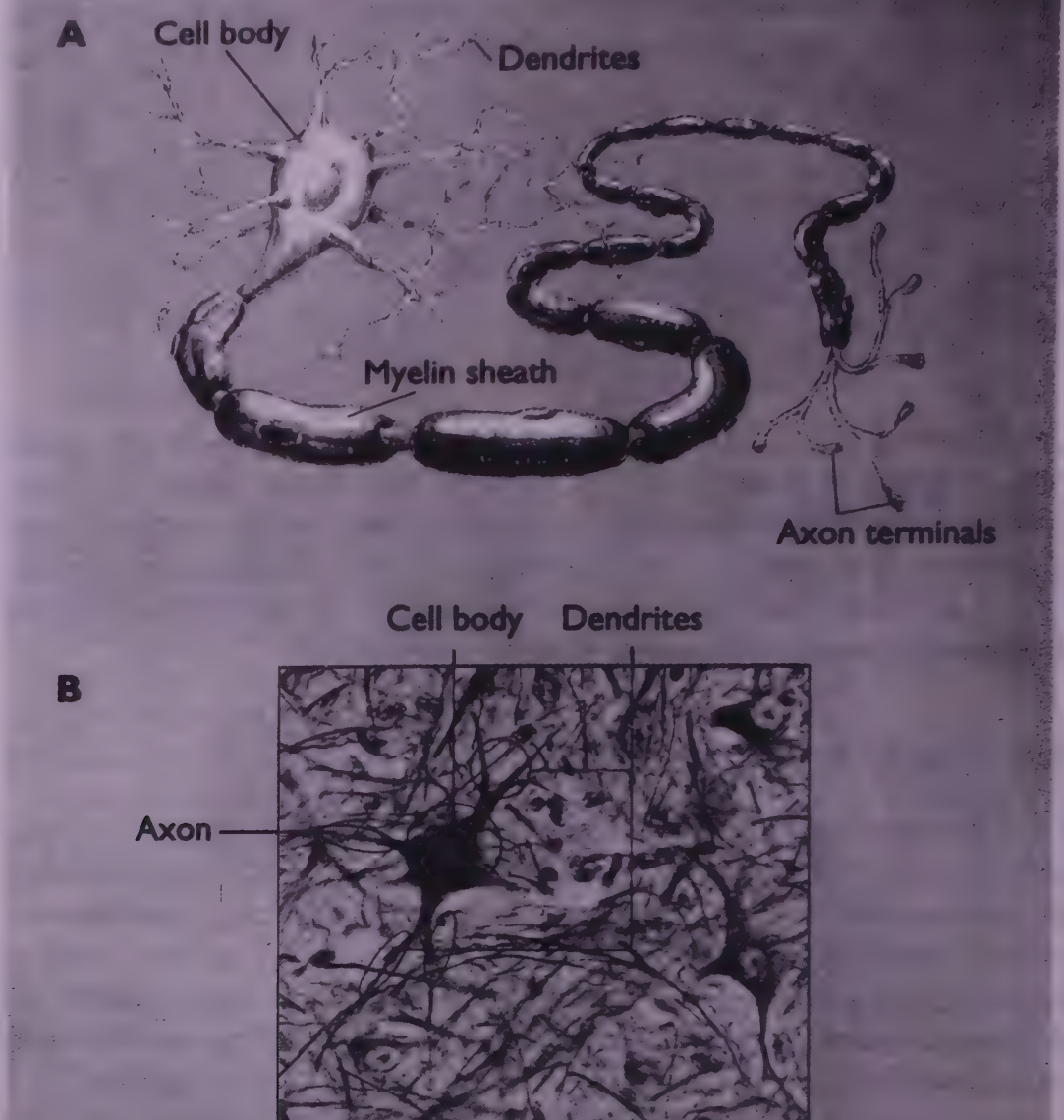
As we consider how neurons function, two questions arise: (1) How does information travel from point to point within a single neuron, and (2) how is information transmitted from one neuron to another or from neurons to other cells of the body?

COMMUNICATION WITHIN NEURONS: THE ACTION POTENTIAL The answer to the first question is complex but can be summarized as follows. When a neuron is at rest, there is a tiny electrical charge (–70 millivolts) across the cell membrane. That is, the inside of the cell has a slight negative charge relative to the outside. This electrical charge is due to the fact that several types of

FIGURE 2.1

Neurons: Their Basic Structure

(A) Neurons appear in many forms, but all possess the basic structures shown here: a cell body, an axon (with axon terminals), and one or more dendrites. (B) Actual human neurons, greatly magnified.



ions (positively and negatively charged particles) exist in different concentrations outside and inside the cell. As a result, the interior of the cell acquires a tiny negative electric charge relative to the outside. This *resting potential* does not occur by accident; the neuron works to maintain the resting potential by actively pumping positively charged ions back outside if they enter while retaining negatively charged ions in greater concentrations than are present outside the cell.

When the neuron is stimulated, either directly (by light, heat, or pressure) or by messages from other neurons, the situation may change radically. If the stimulation is of sufficient magnitude—if it exceeds the *threshold* of the neuron in question—complex biochemical changes occur in the cell membrane. As a result of these changes, some types of *positively charged ions* are briefly allowed to enter the neuron through specialized pores called *ion channels* more readily than before. This influx of positive ions reduces and then totally eliminates the resting potential. Indeed, for a brief period of time, the interior of the cell may actually attain a positive charge relative to the outside.

Action Potential: *A rapid shift in the electrical charge across the cell membrane of neurons. This disturbance along the membrane communicates information within neurons.*

After a very brief period (1 or 2 milliseconds), the neuron then actively pumps the positive ions back outside and allows other ions, which flowed outside via their own ion channels, to reenter. As a result, the resting potential is gradually restored, and the cell becomes ready to "fire" once again. Together, these swings in electric charge—from negative to positive and back again—are termed the **action potential**. And it is the passage of this electrical

disturbance along the cell membrane that constitutes the basic signal within our nervous system.

Note, by the way, that the action potential is an *all-or-none response*. Either it occurs at full strength or it does not occur at all; there is nothing in between. Also, the speed of conduction is very rapid in neurons possessing a myelin sheath. In a sense, the action potential along myelinated axons jumps from one small gap in the sheath to another—openings known as **nodes of Ranvier**. Speeds along myelinated axons can reach 270 miles per hour!

Another basic category of signals within neurons—called **graded potentials**—results from the external physical stimulation of the dendrite or cell body (please refer to Figure 2.1). Unlike the all-or-nothing nature of the action potential, the magnitude of a graded potential varies in proportion to the size of the stimulus that produced it. Thus, a loud sound produces a graded potential of greater magnitude than a softer sound. Because graded potentials weaken quickly, they function primarily to convey incoming information over short distances; usually along the dendrite toward the neuron's cell body. Neurons typically receive information from many other cells—often thousands of them. As a result, it is the overall pattern of graded potentials reaching the cell body that determines whether or not an action potential will occur.

COMMUNICATION BETWEEN NEURONS: SYNAPTIC TRANSMISSION Earlier we saw that neurons closely approach, but do not actually touch, other neurons (or other cells of the body). How, then, does the action potential cross the gap? Existing evidence points to the following answer.

When a neuron "fires," the action potential produced travels along the membrane of the axon to the axon terminals located at the end of the axon. Within the axon terminals are many structures known as **synaptic vesicles**. Arrival of the action potential causes these vesicles to approach the cell membrane, where they fuse with the membrane and then empty their contents into the synapse (see Figure 2.2 on page 50). The chemicals thus released—known as **neurotransmitters**—travel across the tiny synaptic gap until they reach special receptor sites in the membrane of the other cell.

These receptors are complex protein molecules whose structure is such that transmitter substances fit like chemical keys into the locks they provide. Specific transmitters can deliver signals only at certain locations on cell membranes, thereby introducing precision into the nervous system's complex communication system. Upon binding to their receptors, neurotransmitters either produce their effects directly, or function indirectly through the interaction of the neurotransmitter and its receptor with other substances. It's important to note that neurotransmitters are not released exclusively into synapses; they can also be released into body fluids, which carry them to many other cells. As a result, their effects may be quite far-reaching and are not necessarily restricted to other, nearby neurons.

Whether directly or indirectly, neurotransmitters produce one of two effects. If their effects are *excitatory* in nature, they cause a *depolarization* in the membrane of the second cell, making it more likely for the cell to fire. Or the transmitter substances may produce *inhibitory* effects. In this case, they actually *hyperpolarize* (increase the negative electrical charge of) the cell membrane of the second cell, thereby making it less likely that the cell will fire. The **Key Concept** feature (on page 51) diagrams the nervous system's information transmission mechanism.

At this point you may be wondering about an obvious question we haven't yet considered: What happens to neurotransmitters after they cross

Nodes of Ranvier: *Small gaps in the myelin sheath surrounding the axons of many neurons.*

Graded Potential: *A basic type of signal within neurons that results from external physical stimulation of the dendrite or cell body. Unlike the all-or-nothing nature of action potentials, graded potentials vary in proportion to the size of the stimulus that produced them.*

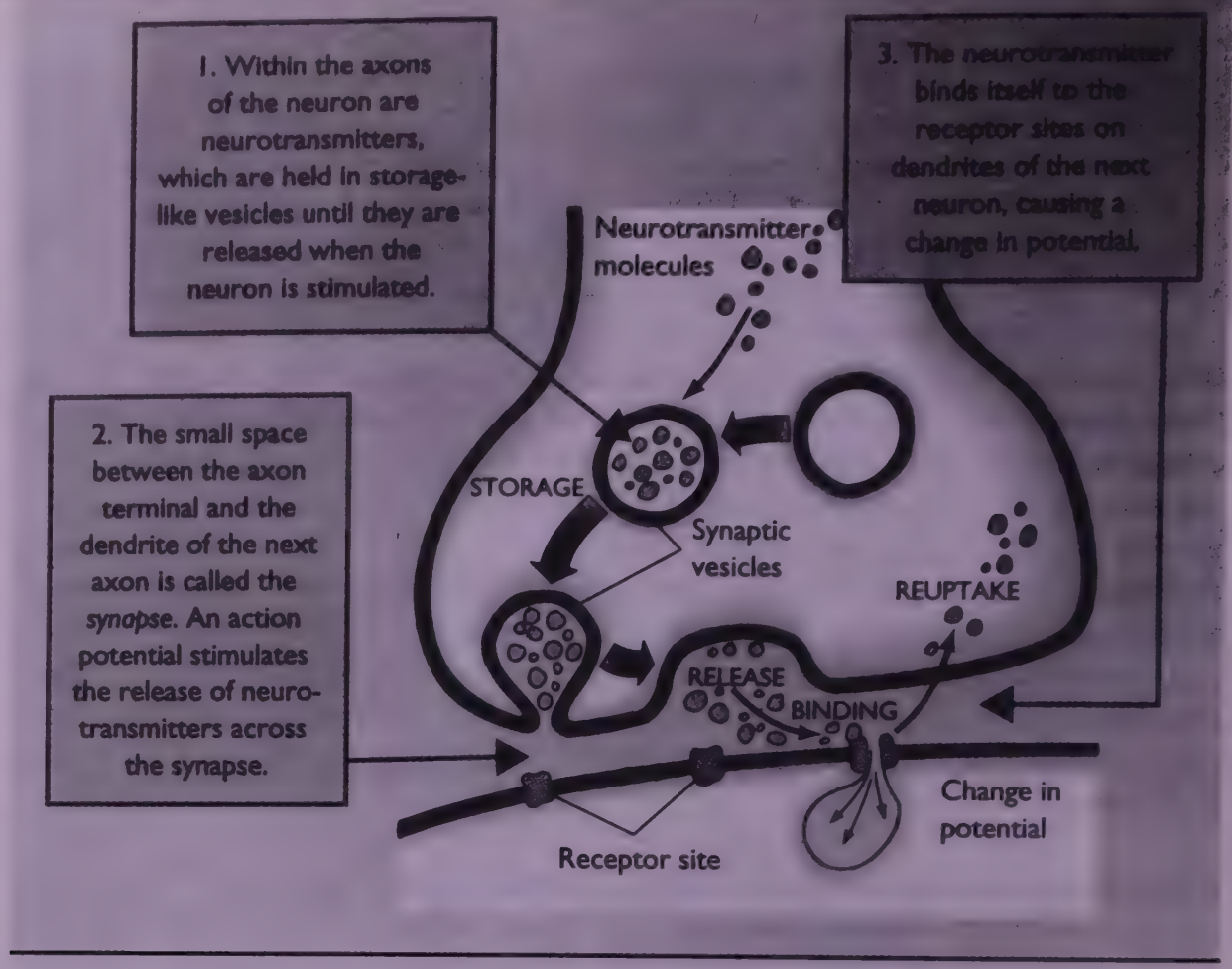
Synaptic Vesicles: *Structures in the axon terminals that contain various neurotransmitters.*

Neurotransmitters: *Chemicals, released by neurons, that carry information across the synapse.*

FIGURE 2.2

Synaptic Transmission: An Overview

The axon terminals found on the ends of axons contain many *synaptic vesicles*. When an action potential reaches the axon terminal, these vesicles move toward the cell membrane. Once there, the vesicles fuse with the membrane and release their contents (*neurotransmitters*) into the synapse.



the synapse? The answer is relatively clear. Either they are taken back for reuse in the axon terminals of the neuron that released them, a process known as *reuptake*, or they are deactivated by various enzymes present at the synapse.

It is important to note that in my comments so far, I have greatly simplified reality by describing a situation in which one neuron contacts another across a single synapse. In fact, this is rarely, if ever, the case. Most neurons actually form synapses with many others—ten thousand or more in some cases. Thus, at any given moment, most neurons are receiving a complex pattern of excitatory and inhibitory influences from many neighbors. Whether a neuron conducts an action potential or not, then, depends on the total pattern of this input (for example, whether excitatory or inhibitory input predominates). Further, the effects of excitatory and inhibitory input can be cumulative over time, in part because such effects do not dissipate instantaneously. Thus, if a neuron that has recently been stimulated, but not sufficiently to produce an action potential, is stimulated again soon afterwards, the two sources of excitation may combine so that an action potential is generated. In one sense, then, neurons act as tiny *decision-making* mechanisms, firing only when the pattern of information reaching them is just right. The fact that individual neurons affect and are, in turn, affected by many others strongly suggests that it is the total pattern or network of activity in the nervous system that is crucial. As we will see in later discussions, it is this intricate web of neural excitation that generates the richness and complexity of our conscious experience.

KEY POINTS

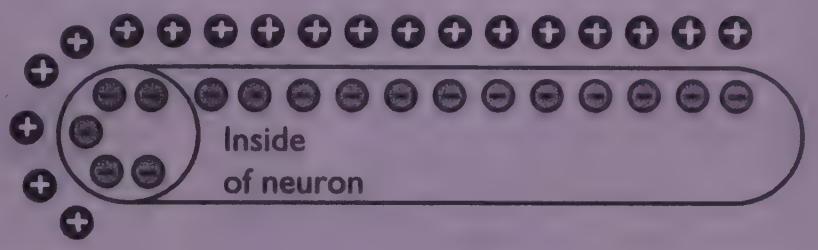
- Biopsychology is the branch of psychology concerned with discovering the biological processes that give rise to our thoughts, feelings, and actions.
- Neurons are cells specialized for receiving, processing, and moving information. They are made up of a cell body, an axon, and one or more dendrites.
- Action potentials are rapid changes in the electrical properties of the cell membranes of neurons. They constitute the basic mechanism by which information moves through the nervous system.
- Neurons communicate across the tiny gaps that separate them by means of neurotransmitters.

KEY CONCEPT

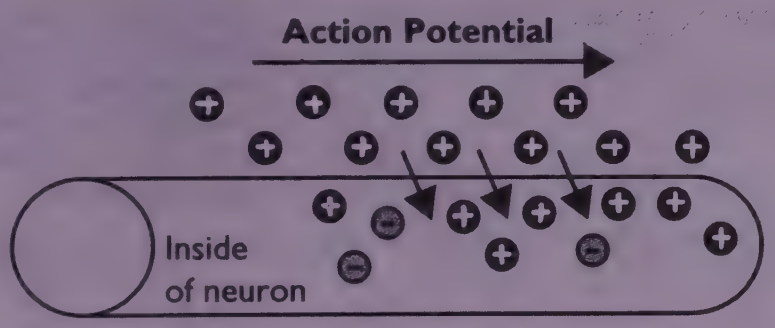
Communication in the Nervous System: Putting It All Together

The key to understanding communication in the nervous system is to understand that information transmission depends on the movement of positively and negatively charged ions across the membrane that covers the neuron.

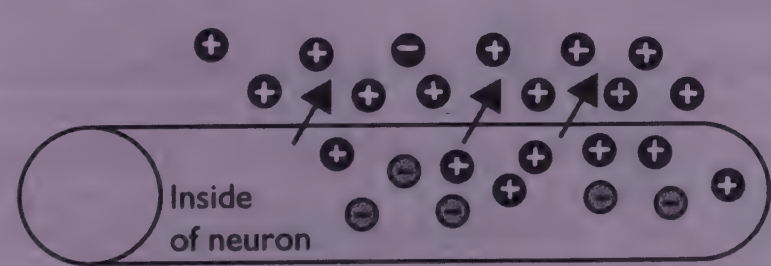
As shown in the diagram, a resting neuron has a slight negative charge (–70 millivolts) across the cell membrane (the inside is negative relative to the outside). The nervous system expends a great deal of energy to maintain this state of readiness. This is because the neuron's cell membrane is not a perfect barrier—it leaks a little, allowing some particles to slip in and others to slip out.



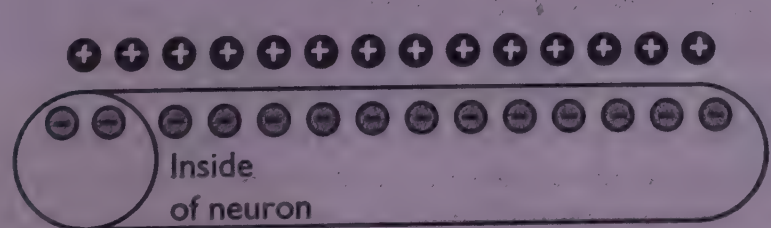
Steps in the Transmission Mechanism



1. When the neuron is stimulated either by an external stimulus or by another neuron, positively charged particles enter the membrane through specialized *ion channels,* thereby momentarily eliminating the negative charge just inside the neuron's membrane. Movement of this disturbance along the membrane constitutes the action potential.



2. After a brief period, positively charged particles are actively pumped back outside of the neuron's membrane via the ion channels.



3. As a result of this active process, the inside of the neuron's membrane regains its negative charge (–70 millivolts) relative to the outside, and the cell is ready to "fire" once more. The passage of this electrical disturbance along the cell membrane serves as the basis for communication in the nervous system.

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Table 2.1

Neurotransmitters: A Summary

Neurons have been found to communicate by means of many different *neurotransmitters*. This table presents several known neurotransmitters, where they are found, and their known or suspected effects on the body.

Neurotransmitter	Location	Effects
Acetylcholine	Found throughout the central nervous system, in the autonomic nervous system, and at all neuromuscular junctions.	Involved in muscle action, learning, and memory.
Norepinephrine	Found in neurons in the autonomic nervous system.	Primarily involved in control of alertness and wakefulness.
Dopamine	Produced by neurons located in a region of the brain called the substantia nigra.	Involved in movement, attention, and learning. Degeneration of dopamine-producing neurons linked to Parkinson's disease. Too much dopamine has been linked to schizophrenia.
Serotonin	Found in neurons in the brain and spinal cord.	Plays a role in the regulation of mood and in the control of eating, sleep, and arousal. Has also been implicated in the regulation of pain and in dreaming.
GABA (gamma-amino-butyric acid)	Found throughout the brain and spinal cord.	GABA is the major inhibitory neurotransmitter in the brain. Abnormal levels of GABA have been implicated in sleep and eating disorders.

Neurotransmitters: Chemical Keys to the Nervous System

The fact that transmitter substances produce either excitatory or inhibitory effects might seem to suggest that there are only two types of neurotransmitters. In fact, there are at least nine universally recognized substances known to function as neurotransmitters, and forty or more peptides (amino acid combinations) appear to *function* as neurotransmitters. Several known neurotransmitters and their functions are summarized in Table 2.1.

Although the specific role of many transmitter substances remains largely unknown, several have been investigated extensively. For example, *acetylcholine* is an important neurotransmitter found throughout the nervous system. Current evidence indicates that acetylcholine is the neurotransmitter at most junctions between motor neurons (neurons concerned with muscular movements) and muscle cells. Thus, anything that interferes with the action of acetylcholine can produce paralysis. Acetylcholine is also believed to play a role in attention, arousal, and memory processes. Scientists believe that the severe memory loss characteristic of persons suffering from *Alzheimer's disease* results from a degeneration of cells that produce acetylcholine. Examinations of the brains of persons who have died from this disease show unusually low levels of this substance (Coyle, Price & DeLong, 1983).

ENDORPHINS Perhaps the most fascinating findings about neurotransmitters and their effects are the result of a surprising discovery first reported in the mid-1970s (Hughes et al., 1975). At that time many researchers who were studying the impact of *morphine* and other opiates discovered that there were special receptor sites for such drugs within the brain. This was indeed intriguing: Why should such receptors exist? The answer was quick in coming: Naturally occurring substances that closely resemble morphine in chemical structure were soon isolated deep within the brain. These substances, known as *endorphins*, seemed to act as neurotransmitters, stimulating specialized receptor sites. But this finding, in turn, raised another question: Why should the brain produce such substances? Research has now suggested one possibility: Endorphins are released by the body in response to pain or vigorous exercise and so help reduce sensations of pain that might otherwise interfere with ongoing behavior (Fields & Basbaum, 1984). Additional evidence indicates that endorphins, more precisely known as *opioid peptides*, also serve to intensify positive sensations—for example, the "runner's high" many people experience after vigorous exercise. As a longtime runner, I can attest to the powerful and pleasant effects exerted by these substances. Indeed, nothing seems to ease the tension of a tough workday better than a long run at the end of the day.

In short, it appears that the brain possesses an internal mechanism for moderating unpleasant sensations and magnifying positive ones, and that the effects of morphine and other opiates stem, at least in part, from the fact that these drugs stimulate this naturally existing system.

This fact, and related evidence, has led to research efforts aimed at identifying drugs to alter synaptic transmission for practical purposes. As we'll see in the **Point of It All** section below, growing evidence suggests that understanding the process of synaptic transmission may be the key to successful treatment of a variety of disorders, including addictions to alcohol and other drugs.

KEY POINTS

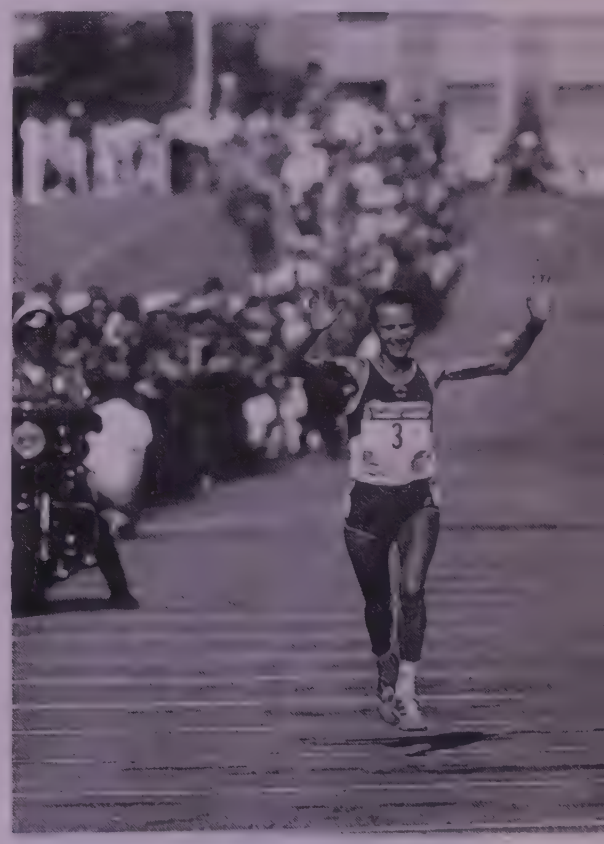
- Neurotransmitters produce one of two effects: Excitatory effects cause a depolarization in the nerve cell membrane, making it more likely that a graded potential will be generated; inhibitory effects hyperpolarize the cell membrane, making it less likely that the cell will fire.
- Many drugs produce their effects by influencing synaptic transmission. Drugs that mimic the impact of neurotransmitters at specific receptors are termed agonists; drugs that inhibit their impact are termed antagonists.
- Growing evidence suggests that knowledge of neurotransmitter systems can be applied to solve important practical problems, including drug and alcohol abuse and certain mental disorders.

THE POINT OF IT ALL

Using Knowledge of Synaptic Transmission to Treat Addictions: Fighting Fire with Fire

If you read newspapers or watch the evening news, you already know that in the closing years of the twentieth century, drugs are big business—very big business. Moreover, the medical portion of this huge industry is by no means the largest part. Each day, hundreds of millions of persons take drugs not to combat illness or improve their health, but to change the way they feel. People use drugs to combat insomnia and to fight fatigue; to calm jittery nerves or increase their energy; to chase away the blues or—perhaps most disturbing of all—simply to get high.

The explosion in recreational drug use (and abuse) during the past several decades has had devastating effects—both economically and socially. Unfortunately, traditional methods used to curb drug abuse or treat drug addictions have been only marginally successful. This fact has led researchers during



ENDORPHINS: NEUROTRANSMITTERS AS PAIN RELIEVERS?

Endorphins are released by the body in response to pain and may also intensify positive bodily sensations, as in the "runner's high."

recent years to consider fighting fire with fire—in other words, using knowledge of how drugs exert their effects on the nervous system to develop effective drug therapies.

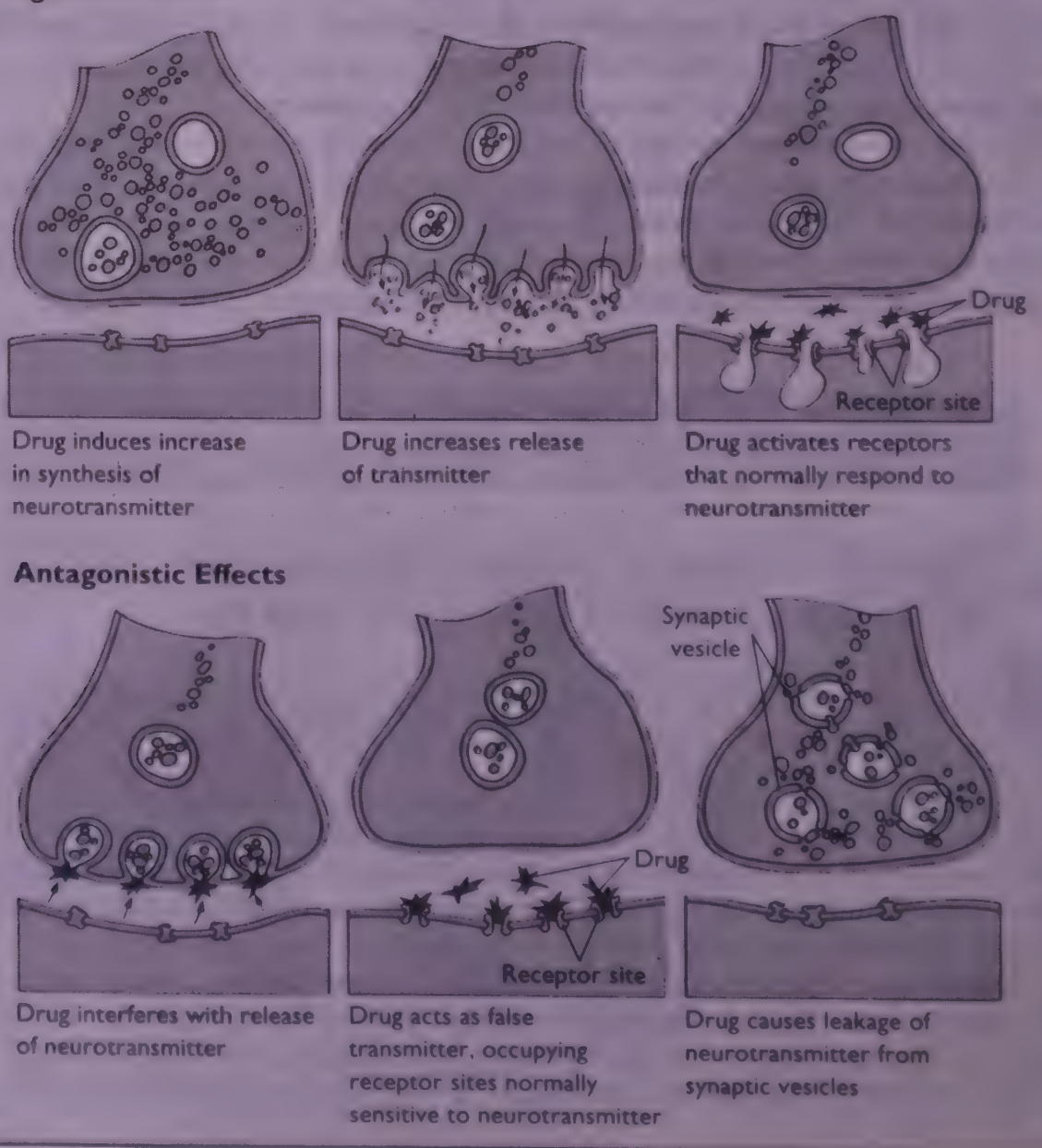
At this point, I hope you've noticed an important link that exists between the topics I have been discussing in this chapter (the structure and function of neurons) and the effects of many drugs. Stated simply, the link is this: In many cases, drugs affect our feelings or behavior by altering the process of synaptic transmission. They produce their effects—including the feelings of pleasure many addicts strongly crave—by changing the complex biochemical events that occur when one neuron communicates with another. In the most basic terms, such effects take one of two major forms. If a particular drug *mimics*, or produces the impact of, a specific neurotransmitter at a receptor, it is said to be an **agonist** of the neurotransmitter. If, in contrast, a drug interferes with, or *inhibits* the impact of, a neurotransmitter at a receptor, it is said to be an **antagonist** of the neurotransmitter. The specific ways in which drugs can function as agonists or antagonists in synaptic transmission are summarized in Figure 2.3.

Many drugs exert their effects on behavior through one or more of these mechanisms (e.g., Kalivas & Samson, 1992). For example, cocaine and amphetamines seem to produce their effects by inhibiting reuptake of such neurotransmitters as *dopamine* and *norepinephrine*. As a result of this inhibition, the neurotransmitters remain in the synapse, where they stimulate continued activity in many neurons. This is one reason why persons taking such drugs often experience feelings of tremendous excitement and energy. Still another mechanism is involved in the impact of various opiates. Morphine is one opiate; another is heroin, a drug whose popularity is currently on the rise

FIGURE 2.3

Drugs: How They Influence Synaptic Transmission

Various drugs produce their effects either by mimicking (agonistic) or by interfering with (antagonistic) the operation of specific transmitter substances.



Agonist: *A drug that mimics the action of a neurotransmitter.*

Antagonist: *A drug that inhibits the impact of a neurotransmitter.*

(Kantrowitz et al., 1993). As mentioned earlier, recent findings indicate that there are special opiate receptors in the brain—neurons whose activation is associated with feelings of well-being and other pleasurable sensations as well as with analgesia, a lessening of pain.

Several converging lines of evidence (Reid, 1990) point to the conclusion that the addicting properties of several drugs may derive, at least in part, from their impact on naturally occurring reward circuits deep within the brain (Bozarth, 1987; Phillips & Fibiger, 1989). If this is indeed the case, then one way of combating such addictions would be to administer other drugs—ones that prevent opiates and other substances that are often abused, such as alcohol, from stimulating the reward circuits.

Some success along these lines has been reported by Volpicelli and his colleagues (1992). These researchers administered the drug naltrexone or a placebo to persons suffering from alcohol dependence. Naltrexone is known to block opioid receptors in the brain—to prevent opiates from stimulating them. Thus, if alcohol also produces pleasurable effects by stimulating these receptors, naltrexone should prevent the pleasure. To the extent it does, the motivation for drinking alcohol should be reduced and its consumption should also fall. Volpicelli and his colleagues found that compared to persons in a control group, persons receiving naltrexone reported much weaker cravings for alcohol, indicated that they drank less alcohol, and—most importantly—were less likely to resume drinking after the study had ended.

Understanding how drugs affect the nervous system, and thus behavior, can be an important step toward developing techniques useful for treating harmful effects, especially those relating to addictions. Knowledge of how various drugs produce their effects has also proved valuable for determining the causes of serious psychological disorders. For example, studies designed to determine exactly how *antidepressants* (drugs that combat depression) work are shedding new light on the neural basis of the serious psychological problem of depression itself (e.g., McNeal & Cimbolic, 1986). In these and other ways, basic knowledge about how neurons function has turned out to be of considerable practical value. This information is already making substantial contributions to the enhancement of human health and well-being.

THE NERVOUS SYSTEM: Its Basic Structure and Functions

If neurons are the building blocks, then the **nervous system** is the structure they, along with other types of cells, combine to erect. Since this system regulates our internal bodily functions and permits us to react to the external world in countless ways, it deserves very careful attention. In this section I will describe the basic structure of the nervous system and will introduce several techniques psychologists use to study its complex functions.

Nervous System: *The complex structure that regulates bodily processes and is responsible, ultimately, for all aspects of conscious experience.*

Central Nervous System: *The brain and the spinal cord.*

Peripheral Nervous System: *The portion of the nervous system that connects internal organs and glands, as well as voluntary and involuntary muscles, to the central nervous system.*

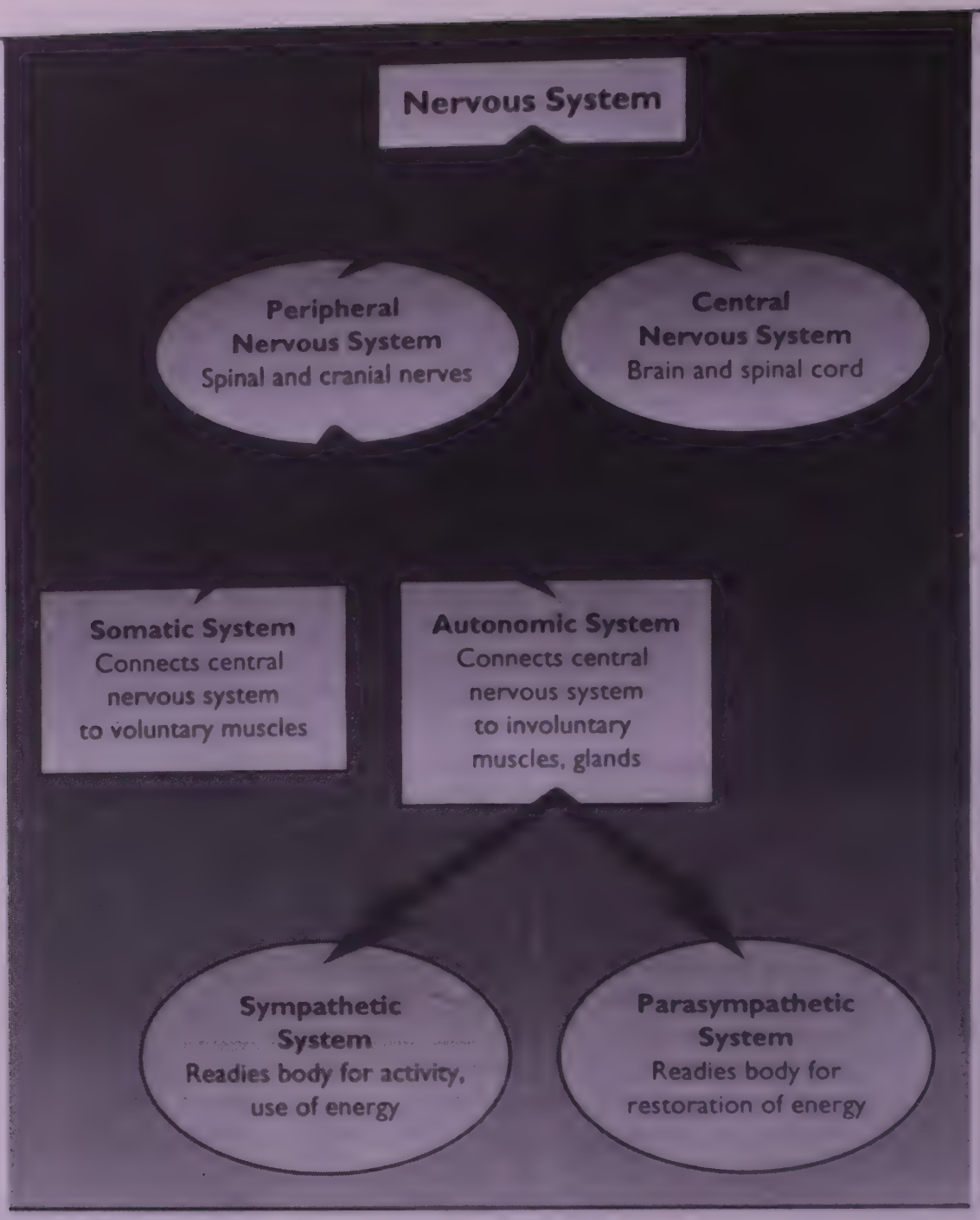
THE NERVOUS SYSTEM: Its Major Divisions

Although the nervous system functions as an integrated whole, it is often viewed as having two major portions—the **central nervous system** and the **peripheral nervous system**. Figure 2.4 (on page 56) diagrams these and other divisions of the nervous system.

FIGURE 2.4

Major Divisions of the Nervous System

The nervous system consists of several major parts.



THE CENTRAL NERVOUS SYSTEM The central nervous system (CNS) consists of the brain and the spinal cord. Since I'll soon describe the structure of the brain in detail, we won't examine it here. The spinal cord runs through the middle of a bony column of hollow bones known as *vertebrae*. You can feel these by moving your hand up and down the middle of your back.

The spinal cord has two major functions. First, it carries sensory information via *afferent* nerve fibers from receptors throughout the body to the brain and conducts information via *efferent* nerve fibers from the brain to muscles and glands. Second, it plays a key role in various *reflexes*. These are seemingly automatic actions evoked rapidly by particular stimuli. Withdrawing your hand from a hot object or blinking your eye in response to a rapidly approaching object are common examples of reflex actions. In their simplest form, reflexes involve neural circuits in which information from various receptors is carried to the spinal cord, where it stimulates other neurons known as *interneurons*. These then transmit

KEY POINTS

- The central nervous system (CNS) consists of the brain and spinal cord.
- The spinal cord carries sensory information from receptors of the body to the brain via afferent nerve fibers and carries information from the brain to muscles and glands via efferent nerve fibers. It also plays a key role in reflexes.

information to muscle cells, thus producing reflex actions. But please take note: Reflexes are usually much more complex than this. Hundreds or even thousands of neurons may influence a reflex, and input from certain areas of the brain may be involved as well. However they arise, spinal reflexes offer an obvious advantage: They permit us to react to potential dangers much more rapidly than we could if we had to consider intellectually how to respond.

THE PERIPHERAL NERVOUS SYSTEM The peripheral nervous system consists primarily of *nerves*, bundles of axons from many neurons, which connect the central nervous system with sense organs and with muscles and glands throughout the body. Most of these nerves are attached to the spinal cord; these *spinal nerves* serve all of the body below the neck. Other nerves known as *cranial nerves* extend from the brain. They carry sensory information from receptors in the eyes and ears and other sense organs; they also carry information from the central nervous system to muscles in the head and neck.

The peripheral nervous system has two further subdivisions: the **somatic** and **autonomic nervous systems**. The somatic nervous system connects the central nervous system to voluntary muscles throughout the body. Thus, when you engage in almost any voluntary action, such as ordering a pizza or reading the rest of this chapter, portions of your somatic nervous system are involved. In contrast, the autonomic nervous system connects the central nervous system to internal organs and glands and to muscles over which we have little voluntary control—for instance, the muscles in our digestive system.

Still, we can't stop dividing things here. The autonomic nervous system, too, consists of two distinct parts. The first is known as the **sympathetic nervous system**. In general, this system prepares the body for using energy, as in vigorous physical actions. Thus, stimulation of this division increases heartbeat, raises blood pressure, releases sugar into the blood for energy, and increases the flow of blood to muscles used in physical activities. The second portion of the autonomic system, known as the **parasympathetic nervous system**, operates in the opposite manner. It stimulates processes that conserve the body's energy. Activation of this system slows heartbeat, lowers blood pressure, and diverts blood away from skeletal muscles (for example, muscles in the arms and legs) and to the digestive system. Figure 2.5 (on page 58) summarizes many of the functions of the autonomic nervous system.

At first glance it might appear that these two parts of the autonomic system compete with one another in a head-on clash. In fact, this is far from the case. The sympathetic and parasympathetic systems actually function in a coordinated manner. For example, after a person eats a large meal on a warm day, the parasympathetic system stimulates digestion while at the same time the sympathetic system increases sweating in order to eliminate excess heat. Similarly, both systems are involved in regulating changes in sexual organs during sexual relations.

Before concluding, I should emphasize that while the autonomic nervous system plays an important role in the regulation of internal bodily processes, it does so mainly by transmitting information to and from the central nervous system. Thus, it is the CNS, ultimately, that runs the show.

KEY POINTS

- The peripheral nervous system consists of the somatic and autonomic nervous systems. The somatic nervous system connects the CNS to voluntary muscles throughout the body, whereas the autonomic nervous system connects the CNS to internal organs and glands and to muscles over which we have little voluntary control.
- The sympathetic nervous system prepares the body for using energy, whereas the parasympathetic nervous system activates processes that conserve the body's energy.
- Psychologists use several methods to study the nervous system, including observing the effects of damage, electrical or chemical stimulation of the brain, and several modern imaging techniques.
- PET scans have been used to show how the brain's activities change in response to experience in certain language tasks. The brain appears to expend less energy as it masters a task.

Somatic Nervous System: *The portion of the peripheral nervous system that connects the brain and spinal cord to voluntary muscles.*

Autonomic Nervous System: *The part of the peripheral nervous system that connects internal organs, glands, and involuntary muscles to the central nervous system.*

Sympathetic Nervous System: *The portion of the autonomic nervous system that readies the body for expenditure of energy.*

Parasympathetic Nervous System: *The portion of the autonomic nervous system that readies the body for restoration of energy.*

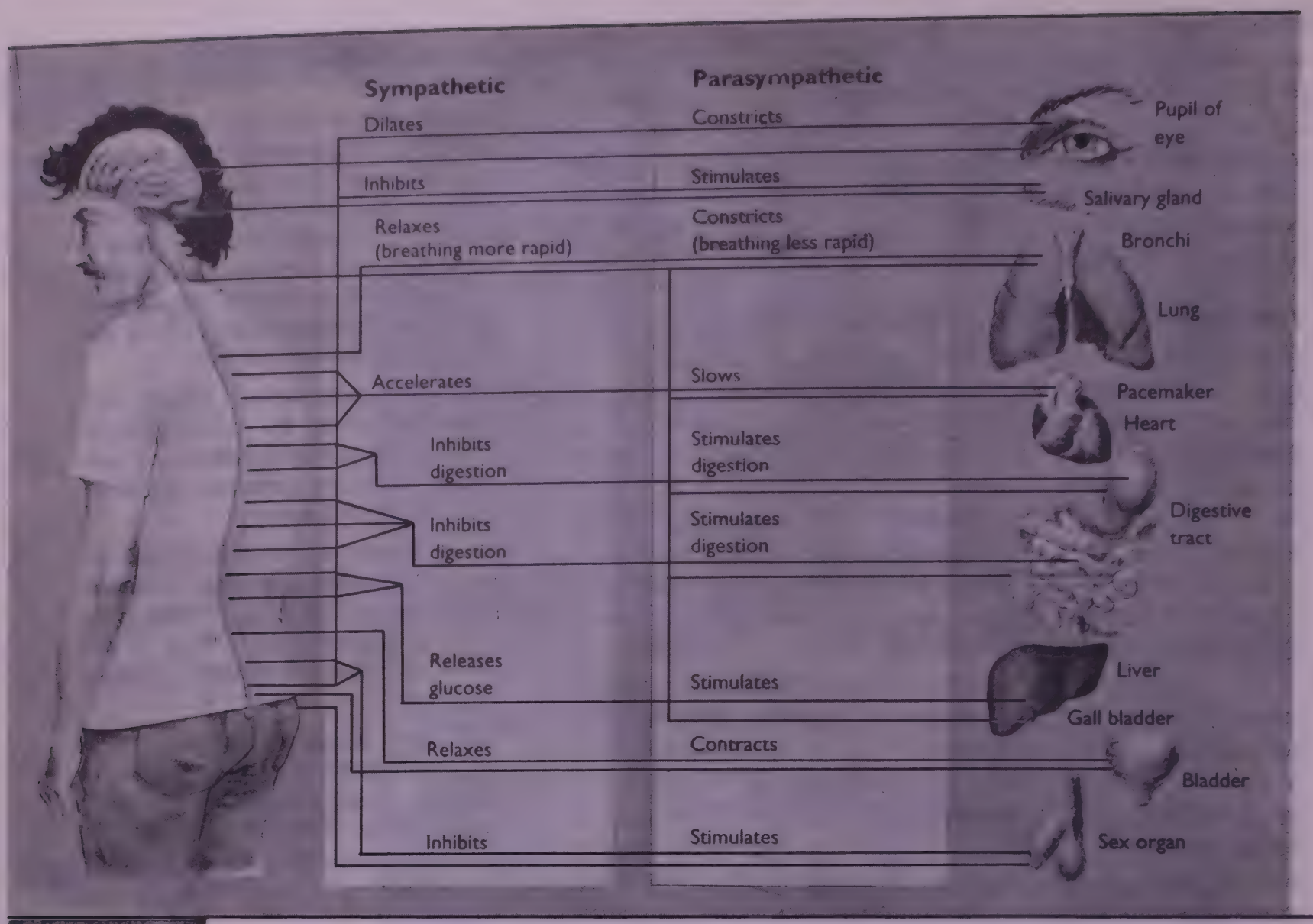


FIGURE 2.5

The Autonomic Nervous System: An Overview

The autonomic nervous system consists of two major parts: the sympathetic and the parasympathetic nervous systems. Some of the functions of each are shown here.

The Nervous System: How It Is Studied

Suppose that you are a psychologist interested in creating a map of the brain, one that reveals the brain structures and processes involved in various mental activities and behaviors. How do you get the information from which to construct your map? While there are no simple answers to this question, biopsychologists and others have devised several ingenious methods for obtaining such information.

Observing the Effects of Damage In one of the earliest methods, researchers observed the behavior of persons who had suffered obvious damage to their brain or nervous system through accident. Then, following their death—sometimes years after the injury had occurred—researchers examined their brains to identify the location and extent of the brain injury. In a related approach, researchers destroy portions of the brain in laboratory animals and then carefully observe the behavioral effects of such damage.

Psychopharmacological Methods: Introducing Drugs into the Brain Psychologists have also mapped the brain's functions by using minute quantities of drugs to produce damage at specific brain sites, or to stimulate or anesthetize specific groups of neurons. If, for example, a drug that anesthetizes neurons is introduced into an area believed to play a role in speech production, we might expect the person's ability to speak to decrease while the drug's effects persist.

Electrical Recording and Brain Stimulation If a particular part of the brain plays a role in some form of behavior, this part should be active during that behavior. Consistent with this reasoning, neuroscientists attempt to study

the nervous system by recording electrical activity within the brain. Sometimes this involves measuring the electrical activity of the entire brain by means of electrodes placed on the skull—a procedure called **electroencephalography**, or **EEG**. In other cases it involves the precise implantation of tiny electrodes in specific locations to *record* the activity of a single neuron or groups of neurons. A related technique utilizes the *delivery* of small electric currents to specific brain areas. By means of the accurate implantation of tiny electrodes, researchers can stimulate specific areas of the brain to investigate their role in various forms of behavior. Researchers also use EEG and related procedures to determine the precise location and timing of mental events. Moreover, intriguing new evidence suggests that these procedures soon may be used to diagnose a variety of cognitive disorders, including Alzheimer's disease (Polich, 1993).

Images of the Living Brain: MRIs, SQUIDs, and PETs

Perhaps most exciting, however, are an alphabet soup of techniques that provide detailed images of the living brain's structures and functions. The first of these techniques is **magnetic resonance imaging**, or **MRI**. Here, images of the brain are obtained by means of a strong magnetic field. Hydrogen atoms, found in all living tissue, emit measurable waves of energy when exposed to such a field. In MRI, these waves are measured and combined to form images of the brain. These MRI images are impressively clear and therefore extremely useful in diagnosing many brain disorders. A high-speed version of MRI known as *functional MRI* captures detailed images of the brain in action.

MRI: A High-Tech Tool to Peek inside the Body

Magnetic resonance imaging provides detailed images of the body's internal structures and is especially useful in diagnosing brain disorders.

A second recently developed imaging device is called **SQUID**—short for **superconducting quantum interference device**. SQUID produces images based on its ability to detect tiny changes in magnetic fields in the brain. Apparently, when neurons fire, they create an electric current. Electric currents, in turn, give rise to magnetic fields that the SQUID interprets as neural activity. Researchers have used SQUIDs to map various brain functions, including construction of a topographical map in the hearing part of the brain. The SQUID tonal map closely resembles a musical scale; one tiny group of cells reacts to a middle C note, an adjacent group to a C sharp, and so on—much like the keys on a piano.

A third high-tech method neuroscientists use to snoop on the living brain is **positron emission tomography**, or **PET**, scans. PET scans provide information regarding the metabolic activity of the brain—how active its various parts are at a given point in time. PET scans do this by measuring blood flow in various neural areas, or by gauging the rate at which glucose, the brain's fuel, is metabolized. Individuals undergoing PET scans are injected with small amounts of harmless radioactive isotopes attached to either water or glucose molecules. Blood flow (containing the radioactive water molecules) is greatest in the most active areas of the brain. Similarly, glucose is absorbed by brain cells in proportion to their level of activity, with the most active cells taking in the greatest amount of glucose. As a result, PET scans allow scientists to map activity in various parts of a person's brain as she or he reads, listens to music, or engages in a mental activity such as solving math problems. Needless to say, such images can contribute much to our understanding of the role of various portions of the brain in many forms of behavior. For more information on practical uses of imaging techniques please refer to the **Point of It All** section on pages 60–61.

Electroencephalography (EEG): *A technique for measuring the electrical activity of the brain via electrodes placed at specified locations on the skull.*

Magnetic Resonance Imaging (MRI): *A method for studying the intact brain in which images are obtained by exposing the brain to a strong magnetic field.*

SQUID (Superconducting Quantum Interference Device): *An imaging device that captures images of the brain through its ability to detect tiny changes in magnetic fields in the brain.*

Positron Emission Tomography (PET): *An imaging technique that detects the activity of the brain by measuring glucose utilization or blood flow.*

The Point of It All

High-Tech Snoopers: Putting Brain-Imaging Devices to Work

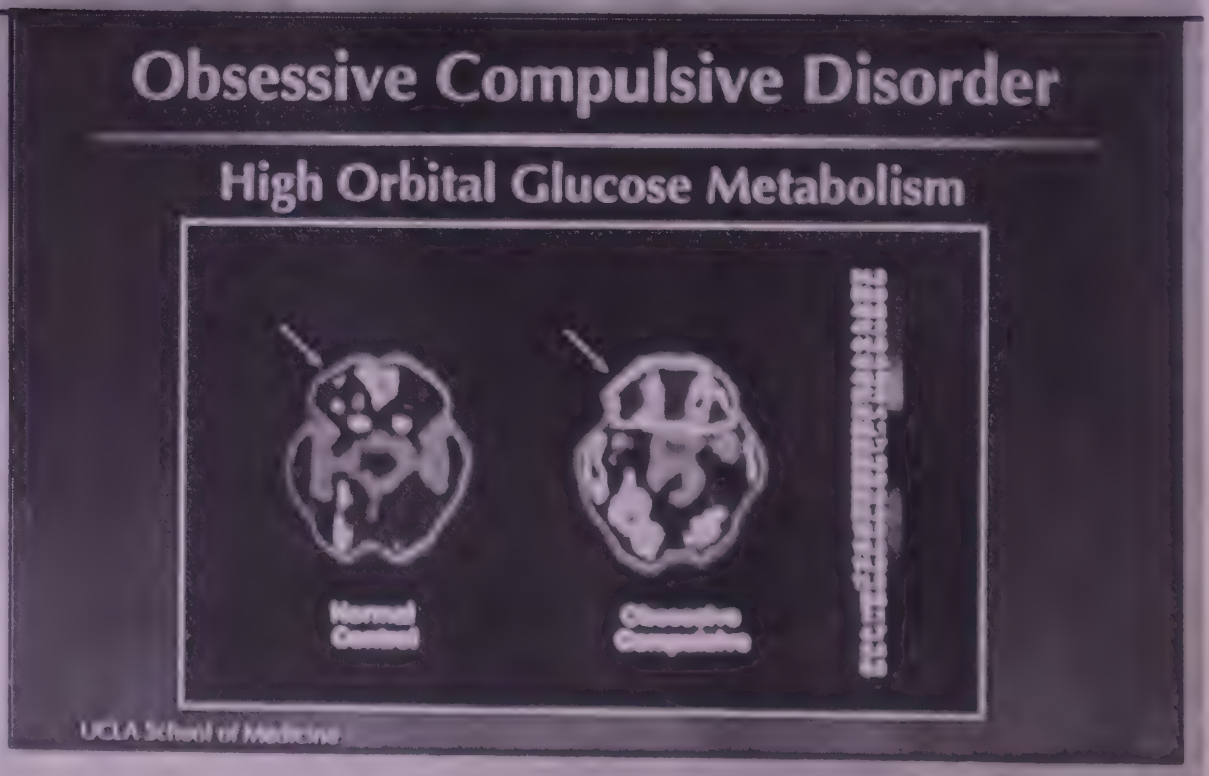
Advances in technology have made it possible to create dynamic images of the living brain. This, in turn, has allowed researchers to apply these techniques in intriguing ways. One application involves performing brain scans on normal persons and on persons with a variety of mental disorders to detect differences in the activity of their brains (Resnick, 1992). For example, as we'll see in chapter 14, *obsessive-compulsive disorder* is characterized by persistent, uncontrollable intrusions of unwanted thoughts and urges to engage in ritualistic behaviors. PET scans of persons with obsessive-compulsive disorder consistently show increased activity in several areas of the brain, including the frontal lobe of the cerebral cortex—a brain region believed to be involved in impulse control and response inhibition (please refer to Figure 2.6). Following successful pharmacologic or psychosurgical treatment, PET scans of these patients' brains show decreased activity in these areas. These findings suggest that imaging techniques may play a useful role in monitoring the effects of treatments for a variety of mental disorders.

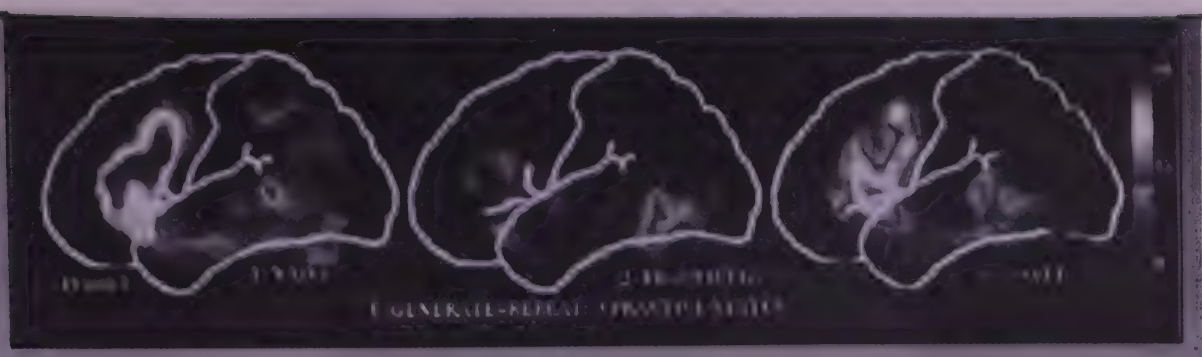
Imaging techniques may also reveal how the brain delegates mental tasks. In one study, researchers used a PET scanner to monitor participants' brains while they performed a fairly simple task—signing their name with their dominant hand (Nadis, 1992). The PET scan showed a low level of activity in a region of the cortex—the region of the brain associated with higher cognitive functions such as thinking, planning, and reasoning. In contrast, a high level of activity was present in the basal ganglia, an area responsible for coordination of motor activity. When participants were asked to write their name with their *nondominant* hand, however, an opposite pattern emerged: decreased activity in the basal ganglia, but increased activity in the brain's cortex. This simple example reveals an important principle regarding how the brain delegates its resources: When we undertake a novel or complex task, a greater overall amount of mental effort is required—especially in the brain's cortex. Later, as we master a task, less mental effort is required, and responsibility for the task is shifted away from the cortex to more automatic brain regions.

Figure 2.6

PET Scanners: A Useful Technique for Detecting Mental Disorders

PET scans provide color-coded maps of the brain's activity. This PET scan shows the brain activity of a normal person (left) and of a patient with obsessive-compulsive disorder (right). Note the increased brain activity in the frontal area of the brain on the right.
(*Source:* Courtesy of Lewis Baxter, UCLA. From Resnick, 1992.)





PET Scanners: A Research Tool for Exploring Important Brain Processes

Brain imaging tools are proving to be important research tools—in this case, for determining how the pattern of activity in the brain changes with experience on a language task.
(*Source:* Fiez & Petersen, 1993.)

Recent evidence suggests that this principle seems to apply to other aspects of information processing as well, including how the brain delegates language-processing tasks (Fiez & Petersen, 1993; Posner & McCandliss, 1993). For example, in one study researchers asked participants to say aloud an appropriate verb for each of several nouns (e.g., baseball–throw, money–spend) at three different times: before they had experience with the task (naive condition); after they had several opportunities to practice with the same set of nouns (practiced condition); and following practice with the task, but with a new set of nouns (novel condition). As shown in Figure 2.7, a PET scan of their brains revealed that the brain delegates language-processing tasks based on experience: Higher activity in the brain's cortex was observed during the naive and novel conditions, but not in the practiced condition. The findings of these and related studies demonstrate that modern imaging techniques are useful tools for increasing our understanding of important brain behavior relationships.

The Brain: Where Consciousness Is Manifest

If there can be said to be a "governing organ" of the body, it is definitely the brain. And what an amazing structure it is! Into slightly more than three pounds the brain crams an array of functions and capacities that even today computer scientists envy. After all, what computer, no matter how huge or advanced, is currently capable of (1) storing seemingly *unlimited* amounts of information for years or decades, (2) rewriting its own programs in response to new input and experience, and (3) simultaneously controlling a vast number of complex internal processes and external activities? Moreover, even if such a computer existed, it could not, as far as we can tell, reproduce the emotional experiences, imagery, insights, and creativity of the human brain.

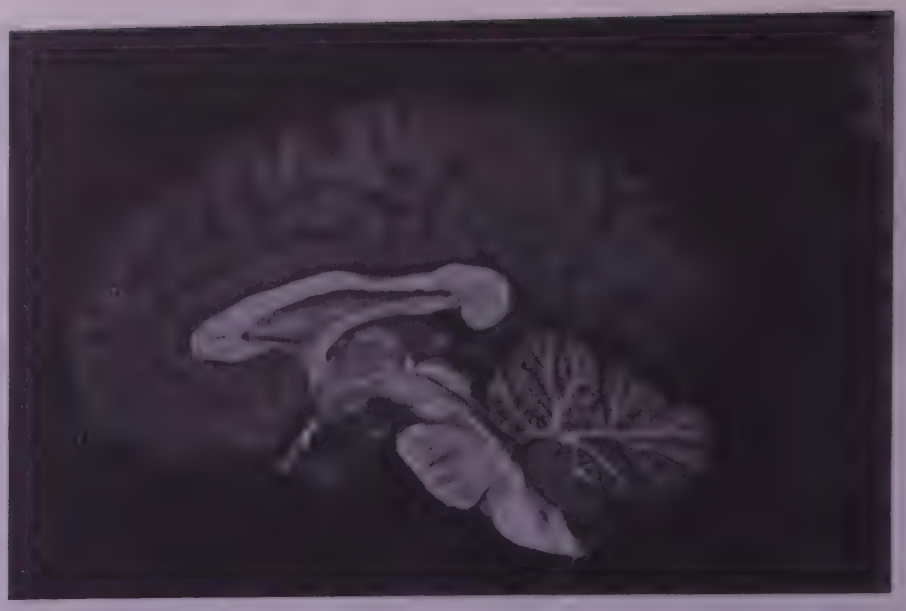
The brain is a complex structure and can be described in many different ways. Often, though, it is divided—for purposes of discussion—into three major components: portions concerned with basic bodily functions and survival; portions concerned with motivation and emotion; and portions concerned with such complex activities as language, planning, foresight, and reasoning.

Survival Basics: The Brain Stem

Let's begin with the basics: the structures in the brain that regulate the bodily processes we share with many other life forms on earth. These structures are

THE HUMAN BRAIN

An actual human brain split in half reveals its inner structure.



located in the *brain stem,* the portion that begins just above the spinal cord and continues into the center of this complex organ (refer to Figure 2.8).

Two of these structures, the **medulla** and the **pons,** are located just above the point where the spinal cord enters the brain. Major sensory and motor pathways pass through both of these structures on their way to higher brain centers or down to effectors (muscles or glands) in other parts of the body. In addition, both the medulla and the pons contain a central core consisting of a dense network of interconnected neurons. This is the **reticular activating system,** and it has long been viewed as a part of the brain that plays a key role in sleep and arousal—a topic I'll discuss in greater detail in chapter 4. Recent evidence, however, indicates that the reticular activating system is also concerned with many seemingly unrelated functions, such as muscle tone, cardiac and circulatory reflexes, and attention (Pinel, 1993). Thus, referring to it as a single "system," which implies a unitary function, is somewhat misleading.

The medulla also contains several *nuclei*—collections of neuron cell bodies—that control vital functions such as breathing, heart rate, and blood pressure, as well as coughing and sneezing.

Behind the medulla and pons is the **cerebellum** (refer again to Figure 2.8). It is primarily concerned with the regulation of motor activities, serving to orchestrate muscular activities so that they occur in a synchronized fashion. Damage to the cerebellum results in jerky, poorly coordinated muscle functioning. If such damage is severe, it may be impossible for a person to stand, let alone to walk or run. Recent evidence suggests the cerebellum may play a role in nonmotor cognitive activities as well (e.g., Daum et al., 1993).

Above the medulla and pons, near the end of the brain stem, is a structure known as the **midbrain**. It contains an extension of the reticular activating system as well as primitive centers concerned with vision and hearing: the *superior colliculi* (vision) and the *inferior colliculi* (hearing). The midbrain also contains structures that play a role in such varied functions as the pain-relieving effects of opiates and the guidance and control of motor movements by sensory input.

Medulla: *A brain structure con-cerned with the regulation of vital bodily functions such as breathing and heartbeat.*

Pons: *A portion of the brain through which sensory and motor information passes and which contains structures relating to sleep, arousal, and the regulation of muscle tone and cardiac reflexes.*

Reticular Activating System: *A structure within the brain concerned with sleep, arousal, and the regulation of muscle tone and cardiac reflexes.*

Cerebellum: *A part of the brain concerned with the regulation and coordination of basic motor activities.*

Midbrain: *A part of the brain containing primitive centers for vision and hearing. It also plays a role in the regulation of visual reflexes.*

EMOTION AND MOTIVATION: THE HYPOTHALAMUS, THALAMUS, AND LIMBIC SYSTEM

Ancient philosophers identified the heart as the center of our emotions. While this poetic belief is still reflected on many valentine cards, modern science indicates that it is wrong. If there is indeed a center for appetites, emo-

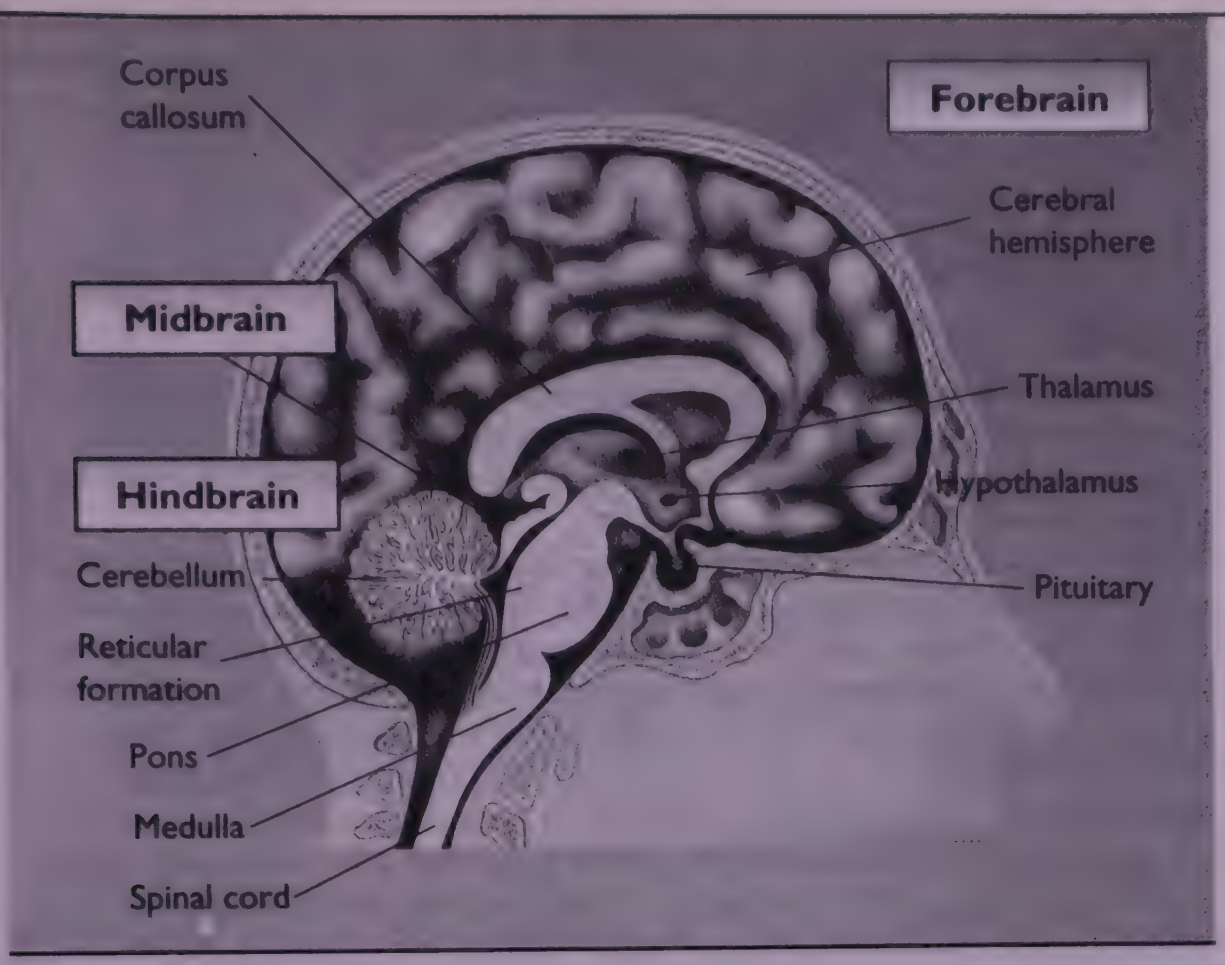


FIGURE 2.8

Basic Structure of the Human Brain

In this simplified drawing, the brain has been split down the middle to show its inner structure.

tions, and motives, it actually lies deep within the brain in several interrelated structures.

Perhaps the most fascinating of these is the **hypothalamus**. Less than one cubic centimeter in size, this tiny structure exerts profound effects on our behavior. First, it regulates the autonomic nervous system, thus influencing reactions ranging from sweating and salivating to the shedding of tears and changes in blood pressure. Second, it plays a key role in *homeostasis*—the maintenance of the body's internal environment at optimal levels. Portions of the hypothalamus seem to play a role in the regulation of eating and drinking, primarily through its impact on metabolism. For example, animals that have suffered damage to the ventromedial hypothalamus tend to overeat, because their bodies show a greatly increased tendency to store calories as fat. As a result, they must keep eating to maintain sufficient stores of available energy in their blood to meet immediate requirements (Gray & Morley, 1986; Powley et al., 1980). Damage to the lateral hypothalamus *reduces* food intake, probably because of a more general reduction in responsiveness to *all* sensory input. In other words, subjects with lesions in the lateral hypothalamus seem to lose interest in many stimuli, including food and drink. (Please see chapter 10 for further discussion of the regulation of eating and of several eating disorders.)

The hypothalamus also plays a role in other forms of motivated behavior such as mating and aggression. It exerts this influence, at least in part, by regulating the release of hormones from the **pituitary gland,** which we'll consider in more detail in our discussion of the endocrine system.

Above the hypothalamus, quite close to the center of the brain, is another important structure, the **thalamus**. This structure consists of two football-shaped parts, one in each hemisphere. This has sometimes been called the great relay station of the brain, and with good reason. The thalamus receives input from all of our senses except olfaction (smell), performs some preliminary analyses, and then transmits the information to other parts of the brain.

Finally, we should consider a set of structures that together are known as the **limbic system**. The functions of this system—and the question of whether

Hypothalamus: *A small structure deep within the brain that plays a key role in the regulation of the autonomic nervous system and of several forms of motivated behavior such as eating and aggression.*

Pituitary Gland: *An endocrine gland that releases hormones to regulate other glands and several basic biological processes.*

Thalamus: *A structure deep within the brain that receives sensory input from other portions of the nervous system and then transmits this information to the cerebral hemispheres and other parts of the brain.*

Limbic System: *Several structures deep within the brain that play a role in emotional reactions and behavior.*

it should even be considered a unitary system—are still unclear. There is some indication, though, that the structures that make up the limbic system play an important role in emotion and in motivated behavior such as feeding, fleeing, fighting, and sex.

The Cerebral Cortex: The Hub of Complex Thought

The **cerebral cortex**—the thin outer covering of the brain—seems to be the part of the brain responsible for our ability to reason, plan, remember, and imagine. In short, this structure accounts for our impressive capacity to process and transform information.

The cerebral cortex is only about one-eighth of an inch thick, but it contains billions of neurons, each connected to thousands of others. The predominance of cell bodies gives the cortex a brownish-gray appearance. Because of its appearance, the cortex is often referred to as gray matter. Beneath the cortex are myelin-sheathed axons connecting the neurons of the cortex with those of other parts of the brain. The large concentrations of myelin gives this tissue an opaque appearance, and hence it is often referred to as white matter. It is important to note that the cortex is divided into two nearly symmetrical halves, the *cerebral hemispheres.* Thus, many of the structures described below appear in both the left and right cerebral hemispheres. As we'll soon see, however, this similarity in structure is not entirely matched by similarity in function. The two hemispheres appear to be somewhat specialized in the functions they perform.

The cerebral hemispheres are folded into many ridges and grooves, which greatly increase their surface area. Each hemisphere is usually described, on the basis of the largest of these grooves or *fissures*, as being divided into four distinct regions or lobes.

The Frontal Lobe Occupying the area of the brain nearest the face, the **frontal lobe** is bounded by the deep *central fissure.* Lying along this fissure, just within the frontal lobe, is the *motor cortex*, an area concerned with the control of body movements (see Figure 2.9). Damage to this area does not produce total paralysis. Instead, it often results in a loss of control over fine movements, especially of the fingers. This illustrates an important fact about the human brain: While a specific area may normally perform a given function, other regions can often take up the slack if an area is damaged and may gradually come to perform the same functions. Such *plasticity*, as it is often termed, is greater at a young age than after maturity, but it seems to operate to some extent throughout life.

Cerebral Cortex: *The outer covering of the cerebral hemispheres.*

Frontal Lobe: *The portion of the cerebral cortex that lies in front of the central fissure.*

Parietal Lobe: *A portion of the cerebral cortex, lying behind the central fissure, that plays a major role in the skin senses: touch, temperature, and pressure.*

Occipital Lobe: *A portion of the cerebral cortex involved in vision.*

The Parietal Lobe Across the central fissure from the frontal lobe is the **parietal lobe**. This contains the *somatosensory cortex*, to which information from the skin senses—touch, temperature, pressure, and so on—is carried. (Refer to Figure 2.9.) Discrete damage to this area produces a variety of effects, depending in part on whether injury occurs to the left or right cerebral hemisphere. If damage involves the left hemisphere, individuals may lose the ability to read or write, or they may have difficulty knowing where parts of their own body are located. In contrast, if damage occurs in the right hemisphere, individuals may seem unaware of the left side of their body. For example, a male may forget to shave the left side of his face.

The Occipital Lobe The **occipital lobe** is located near the back of the head. Its primary functions are visual, and it contains a sensory area that

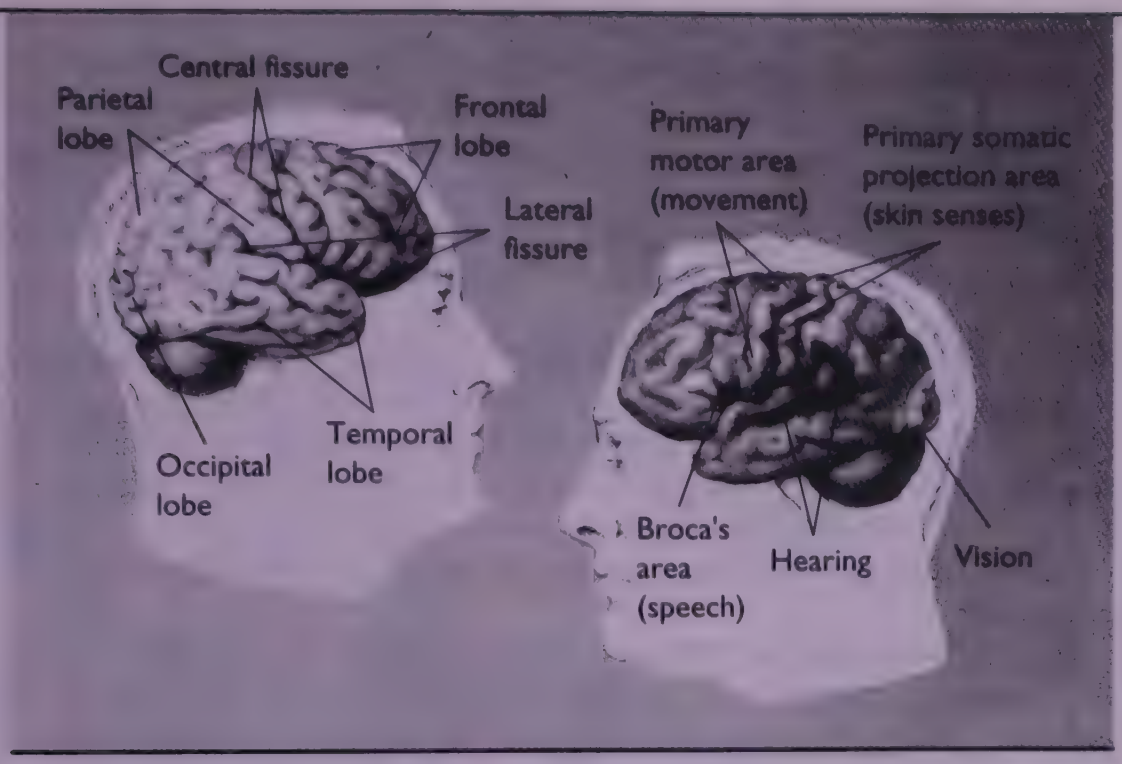


FIGURE 2.9

Major Regions of the Cerebral Cortex

The cerebral cortex is divided into four major lobes (left drawing). Specific areas in these lobes are concerned with sensory and motor functions (right drawing).

receives input from the eyes. Damage to this area often produces a "hole" in the person's field of vision: Objects in a particular location can't be seen, but the rest of the visual field is unaffected. Interestingly, in cases of severe damage to the occipital lobes, people may report complete loss of vision, yet respond appropriately to certain visual stimuli as if they *had* seen them. As with other brain structures, injury to the occipital lobe may produce contrasting effects depending on which cerebral hemisphere is affected. Damage to the occipital lobe in the right hemisphere produces loss of vision in the left visual field, whereas damage to the occipital lobe in the left hemisphere produces loss of vision in the right visual field.

THE TEMPORAL LOBE Finally, the **temporal lobe** is located along the side of each hemisphere (see Figure 2.9). The location makes sense, for this lobe is concerned primarily with hearing and contains a sensory area that receives input from the ears. Damage to the temporal lobe, too, can result in intriguing symptoms. When such injuries occur in the left hemisphere, people may lose the ability to understand spoken words. When damage is restricted to the right hemisphere, they may be able to recognize speech but may lose the ability to recognize other organizations of sound—for example, melodies, tones, or rhythms.

It is interesting to note that when added together, areas of the cortex that either control motor movements (*motor cortex*) or receive sensory input (*sensory cortex*) account for only 20 to 25 percent of the total area. The remainder is known as *association cortex* and, as its name suggests, is assumed to play a role in integrating the activities in the various sensory systems and in translating sensory input into programs for motor output. In addition, the association cortex seems to be involved in complex cognitive activities such as thinking, reasoning, and remembering. However, evidence concerning its role in these functions is incomplete at best (Pinel, 1993).

Temporal Lobe: The portion of the cerebral cortex that is involved in hearing.

LANGUAGE AND THE CEREBRAL CORTEX

We have noted that many complex mental activities seem to take place in the cerebral cortex. If this is indeed the case, then it should be possible to identify

areas of the cortex that are responsible for language—the abilities to speak, read, write, and so on. Not surprisingly, much research has been directed to this topic, and investigators have made considerable progress in understanding where and how the brain handles language. In the discussion that follows, I'll first outline a relatively simple model initially proposed to explain the neural bases of language. Then I'll provide a rough sketch of a more accurate picture that has emerged more recently (Peterson et al., 1989).

The Wernicke-Geschwind Model Writing in the mid-nineteenth century, Paul Broca suggested that an area of the left frontal lobe, just in front of the primary cortex, played a key role in this process. Specifically, he noted that damage to this area left people able to understand speech but with reduced capacity to produce it. Broca concluded that this area of the brain contained memories for the sequence of muscular movements needed for fluent speech.

Some years later, in 1874, another researcher, Karl Wernicke, suggested that a second area, located in the left temporal lobe just behind the primary auditory cortex, also played a key role in language. Wernicke noticed that damage to this region left people able to speak but with reduced understanding of spoken or written words. In other words, such persons could speak fluently, but they could not readily understand what was said to them.

Almost one hundred years later, Geschwind combined these suggestions, plus other data, into a unified model known as the **Wernicke-Geschwind theory** (Geschwind, 1972). According to this model, both areas of the cortex identified by Broca and Wernicke, pathways connecting them, and several other regions including the primary visual cortex and the primary motor cortex function together in the production and comprehension of language. By way of illustration, here is how the theory describes what happens in the brain when language is actually used—when, for example, you engage in a conversation with another person. According to the Wernicke-Geschwind model, auditory signals triggered by the other person's speech are received by your primary auditory cortex and conducted to Wernicke's area, where they are comprehended. Neural information then moves from Wernicke's area to Broca's area via a pathway known as the *arcuate fasciculus*. In Broca's area, information about the muscular movements needed to produce speech is activated. This, in turn, is transmitted to the primary motor cortex, which stimulates muscles in your larynx and elsewhere. The result: overt speech occurs (see Figure 2.10).

Evidence Relating to the Wernicke-Geschwind Model Is this model accurate? Does it really describe the sequence of events within the brain that permits us to understand and use language? Growing evidence suggests that it does not. Careful study of persons suffering from some form of *aphasia*—brain damage–produced disturbances in the ability to use or comprehend language—argues against accepting this model as accurate. First, consider what happens when parts of the cortex are removed for medical reasons. In some cases, operations have removed areas viewed as crucial by the Wernicke-Geschwind model. Despite this fact, many patients show little disruption in their language skills, thereby calling basic assumptions of the theory into question (Rasmussen & Milner, 1975).

Second, scans of the brains of individuals suffering from language-related problems rarely if ever show damage in either Broca's or Wernicke's area. This has been the case even when patients showed language deficits quite similar to the ones originally used to establish the importance of these areas (Naeser et al., 1981).

Wernicke-Geschwind Theory: *A theory of how the brain processes information relating to speech and other verbal abilities. Although the theory has generated a considerable amount of research, recent evidence suggests that it does not provide an adequate picture of this process.*

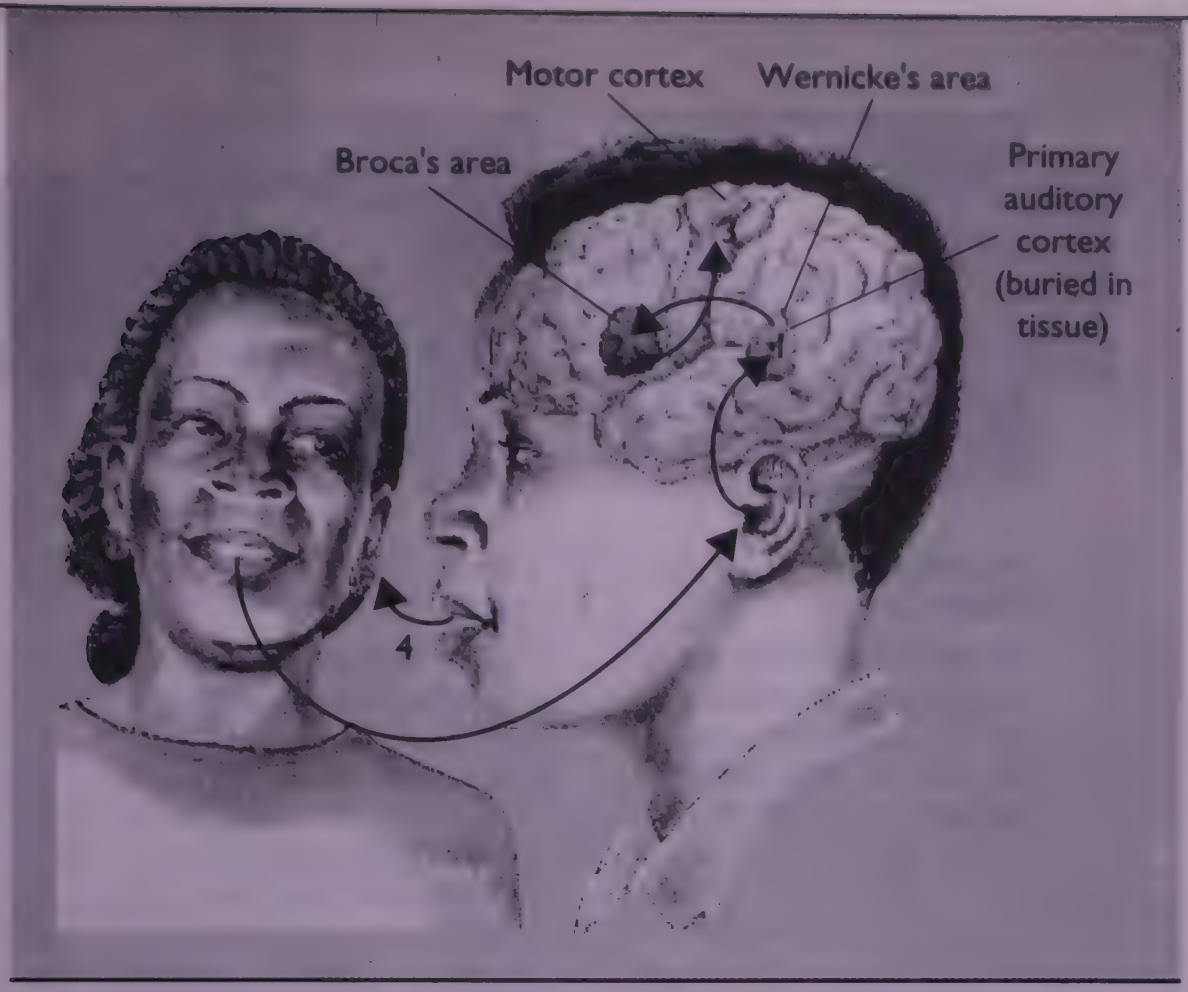


FIGURE 2.10

The Wernicke-Geschwind Model of Human Speech

The Wernicke-Geschwind model of speech suggests that information received by the ears is transmitted to the primary auditory cortex (1). From there it moves to Wernicke's area, where it is comprehended. Neural information is then sent from this area to Broca's area (2). There it activates information concerned with the muscular movements needed to produce speech. When this information is transmitted to the motor cortex (3), actual speech occurs (4).

Finally, when the brains of persons who have suffered accidental or disease-related damage during life are examined after their deaths or during medical operations, predictions of the Wernicke-Geschwind model concerning how the location of such damage should be related to language deficits are again not confirmed. For example, one study examined the brains of 214 persons who had experienced lesions in Broca's and Wernicke's areas, and not one demonstrated the kind of language deficits predicted by the model (Hecaen & Angelergues, 1964).

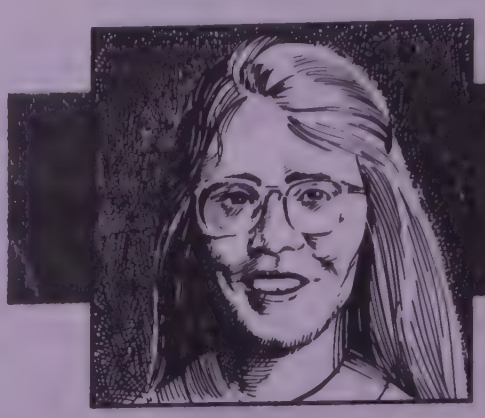
Together, these findings suggest that the model proposed by Geschwind should not be viewed as accurate. But if the Wernicke-Geschwind theory is incorrect, how is language represented in the brain? A more modern view is briefly described below.

Parallel Models of the Neural Basis of Language

The Wernicke-Geschwind theory is sometimes described as a *serial* model—it suggests that neural events relating to language occur one step at a time and along one route. Many psychologists believe that such models are flawed and instead suggest that language and other complex mental processes may be more accurately represented by *parallel* models—ones suggesting that neural information can move along several routes at once and be processed simultaneously in different ways in different areas of the brain. Given the incredible complexity of language, such models seem to make very good sense. More importantly, however, they are supported by a growing body of evidence (Peterson et al., 1989).

KEY POINTS

- The brain stem, including the medulla, pons, and cerebellum, is concerned primarily with the regulation of basic bodily functions. The cerebellum may be involved in higher cognitive processes.
- The hypothalamus and thalamus are involved in the regulation of motivated behavior and in emotion.
- Damage to the ventromedial hypothalamus increases food intake as a result of the dramatic impact on metabolism. Damage to the lateral hypothalamus reduces food intake.
- The cerebral cortex is the hub for higher mental processes such as thinking, language, planning, reasoning, and memory.
- Language processing in the brain is most consistent with parallel models, which suggest that neural information moves along several routes and is processed simultaneously in different brain regions.



Sarah Fryer Leibowitz

Leibowitz's extensive research on neurotransmitters has included pharmacological, biochemical, physiological, and behavioral studies.

James Olds (1922–1976)

Olds and his graduate student Peter Milner pursued work on mapping pleasure and pain centers in the brain. They were able to induce effects of pleasure and pain by stimulating various areas of the brain.

KEY PEOPLE IN BIOPSYCHOLOGY

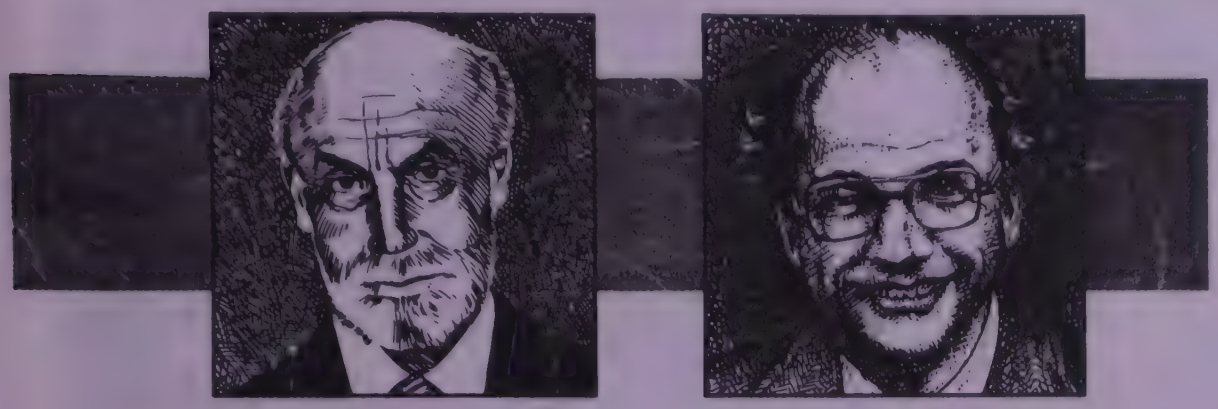
LATERALIZATION OF THE CEREBRAL CORTEX: Two Minds in One Body?

A simple visual inspection of the two halves of the human brain would lead casual observers to conclude that they are mirror images of one another. Yet a large and rapidly growing body of evidence suggests that the cerebral hemispheres of the human brain are quite different—at least with respect to their function.

In other words, the brain shows a considerable degree of **lateralization of function**. Each hemisphere seems to be specialized for the performance of somewhat different tasks. Speech is one of the most important of these. For a large majority of human beings, this crucial process is located primarily in the *left* hemisphere (Benson, 1985). In fact, taken as a whole, research on lateralization of brain functions points to the following conclusions: In many persons, though by no means all, the left hemisphere specializes in verbal activities like speaking, reading, and writing and in logical thought and the analysis of information. The right hemisphere specializes in the control of certain motor movements, in synthesis (putting isolated elements together), and in the comprehension and communication of emotion. Many studies employing diverse methods and procedures support these basic conclusions.

Lateralization of Function: *Specialization of the two hemispheres of the brain for the performance of different functions.*

For purposes of summarizing, it is most convenient to divide these studies into two major categories: investigations conducted with noninjured persons



Roger Wolcott Sperry

Sperry is known for his research in the fields of psychobiology, neuropsychology, and neurobiology. He has focused on exploring neural plasticity by nerve and muscle transplantation, the split-brain approach to cerebral organization, and human value implications.

Michael Gazzaniga

Gazzaniga is currently concerned with brain lateralization and with mapping specific mental processes in the brain. He was led to a career in psychology by his "fascination with understanding the possible brain mechanisms of the mind."

and studies conducted with persons whose cerebral hemispheres have been isolated from each other through surgery.

Research with Intact (Noninjured) Persons

In some respects, the most convincing evidence for lateralization of function in the cerebral hemispheres is provided by research employing the drug *sodium amytal*. When injected into an artery on one side of the neck, this drug quickly anesthetizes the cerebral hemisphere on that side. During the few minutes that elapse before the anesthesia passes, a person can be tested on a number of different tasks. Studies using these procedures indicate that for most individuals, the left hemisphere possesses much more highly developed verbal skills than the right hemisphere. For example, when the right hemisphere is anesthetized, participants can—through the functioning of their left hemispheres—recite letters of the alphabet or days of the week, name familiar objects, and repeat sentences. In contrast, when the left hemisphere is anesthetized and only the right hemisphere is available, participants experience considerably more difficulty in performing such tasks. Further, the more complex the tasks, the greater the deficits in performance (Milner, 1974).

Additional evidence for lateralization of brain function is provided by studies using PET scan procedures. These studies indicate that when individuals speak or work with numbers, activity in the left hemisphere increases. In contrast, when they work on perceptual tasks—for instance, tasks in which

they compare various shapes—activity increases in the right hemisphere (e.g., Springer & Deutsch, 1985). Interestingly, additional research suggests that while individuals are making up their minds about some issue, activity is higher in the left than in the right hemisphere (Cacioppo, Petty, & Quintanar, 1982). However, once logical thought is over and a decision has been made, heightened activity occurs in the right hemisphere, which seems to play a larger role in global, nonanalytic thought.

A third line of evidence pointing to differences between the left and right hemispheres relates to the ability to recognize and communicate emotions. Several studies (e.g., Bryden, Ley, & Sugarman, 1982) suggest that the right hemisphere is faster than the left hemisphere at recognizing signs of emotional arousal, such as facial expressions, in others. In addition, some findings indicate that the two hemispheres themselves may even play different roles in different emotional experiences (Springer & Deutsch, 1985). Apparently, the left hemisphere is more active during positive emotions, whereas the right hemisphere is more active during negative ones (Miller, 1987). Thus, individuals suffering from depression (intense negative feelings) often show higher activity in the frontal lobes of their right hemispheres than do persons not suffering from depression.

Research with Split-Brain Participants: Isolating the Two Hemispheres

Under normal conditions, the two hemispheres of the brain communicate with each other primarily through the **corpus callosum,** a wide band of nerve fibers that passes between them. Sometimes, though, it is necessary to sever this link—for example, in order to prevent the spread of epileptic seizures from one hemisphere to the other. Careful study of individuals who have undergone such operations provides intriguing evidence on lateralization of function of the brain (Gazzaniga, 1984, 1985; Sperry, 1968)

For example, consider the following demonstration. A man whose corpus callosum has been cut is seated before a screen and told to stare, with his eyes as motionless as possible, at a central point on the screen. Then simple words such as *tenant* are flashed across the screen so that the letters *ten* appear to the left of the central point and the letters *ant* appear to the right. What does the man report seeing? Before you guess, consider the following fact: Because of the way our visual system is constructed, stimuli presented to the *left* visual field of each eye stimulate only the *right* hemisphere of the brain; items on the *right* side of the visual field of each eye stimulate only the *left* hemisphere (please refer to Figure 2.11).

Now, what do you think the split-brain man reports? If you said "ant," you are correct. This would be expected, since only the left hemisphere, which controls speech, can answer verbally. However, when asked to *point* to the word he saw on a list of words, the man reacts differently: He points with his left hand to the word *ten*. So the right hemisphere has indeed seen and recognized this stimulus; it simply can't describe it in words.

Perhaps even more dramatic evidence for the existence of differences between the left and right hemispheres is afforded by situations in which each cerebral hemisphere is provided with different information. For example, consider this simple demonstration. In one study, pictures of two objects were presented on a screen. One picture was presented only to the left visual field, while the other was presented only to the right visual field (refer again to Figure 2.11). Then participants were asked to reach into two bags, simulta-

Corpus Callosum: *A band of nerve fibers connecting the two hemispheres of the brain.*

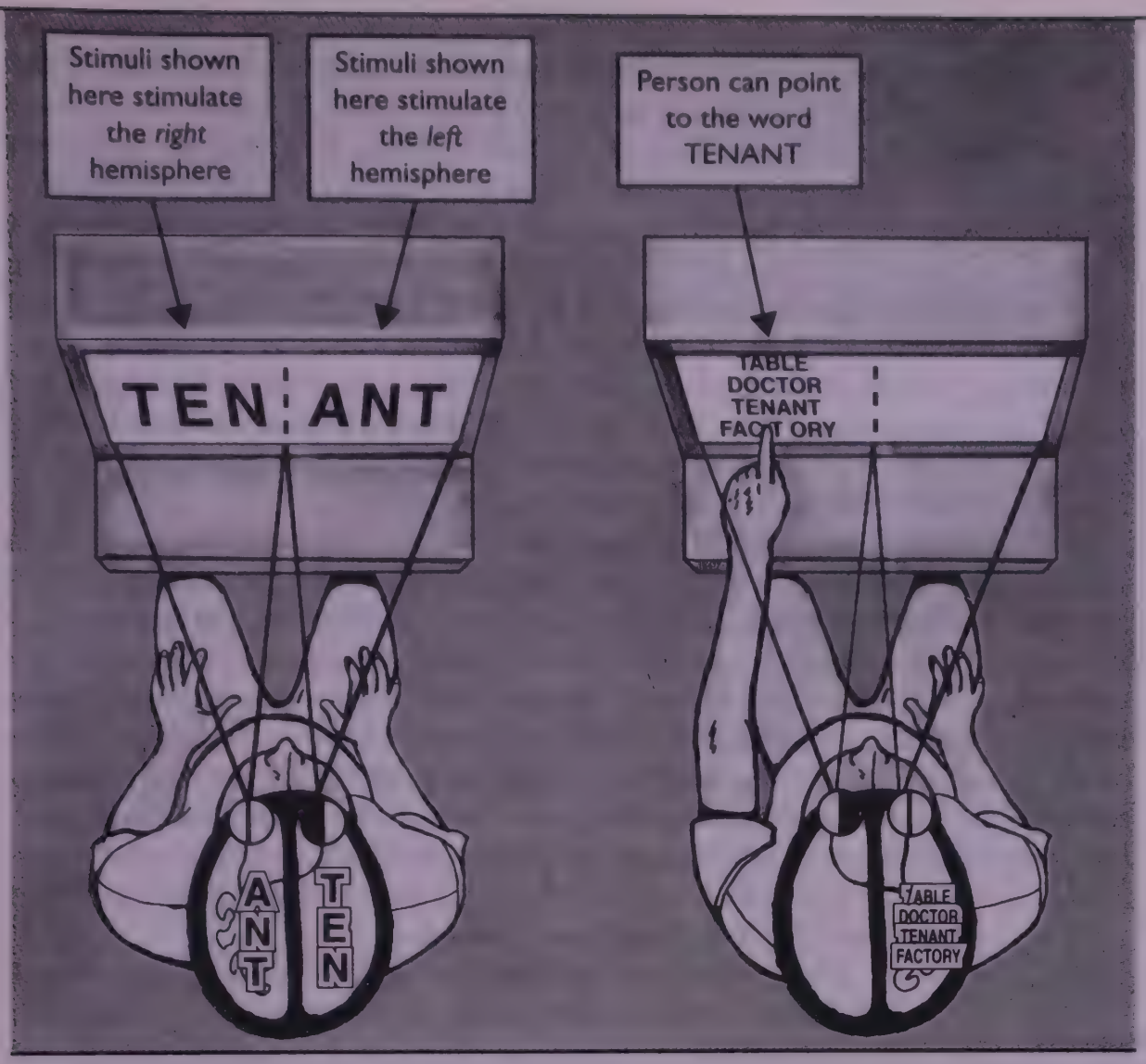


FIGURE 2.11

Some Intriguing Effects of Severing the Corpus Callosum

If a simple word such as *tenant* is shown to a person whose corpus callosum has been severed, the letters *ten* stimulate only the right hemisphere while the letters *ant* stimulate only the left hemisphere. The person then reports seeing *ant* (left drawing). This is because only the left hemisphere can respond to the verbal question "What do you see?" If shown a list of words and asked to point to the one seen previously, however, the split-brain person can do so correctly; he or she points to *tenant* with the left hand (right drawing). This indicates that the right hemisphere recognizes this word and can respond to it in a nonverbal manner (that is, by pointing).

neously, and select the objects shown. Before withdrawing their hands from the bags, participants were asked to describe what each hand held. Almost invariably, they named the object shown to the right visual field which, of course, stimulated the verbally advanced left hemisphere. Imagine their surprise when, on looking in their hands, they found that they actually held two different objects—the ones flashed on the screen.

Putting the Brain Back Together Again: Multiple Resource Theory

The two hemispheres of the brain show differences that are often striking (Zaidel, 1994). The existence of these differences raises interesting questions about how these separate systems coordinate their efforts to produce consciousness—the perception of continuity we have in relation to the world around us. The manner in which the brain orchestrates interaction between the two sides of the brain, however, is not always easily predicted. Some information-processing tasks require the combined efforts of both hemispheres of the brain, whereas others are carried out independently by one side of the brain.

Several recent investigations suggest that the extent of cooperation between the two sides of the brain is based on the relative costs and benefits—or efficiency—of doing so (Hellige, 1993). One particularly important factor appears to be the difficulty of the task; performance on cognitively difficult tasks is enhanced through cooperation *between* the brain's hemispheres, whereas simple tasks are carried out more efficiently *within* a single hemisphere (Banich & Belger, 1990). As an illustration of this concept, consider a study in which participants were asked to compare pairs of visual stimuli and to judge whether the stimuli were the same or different. The comparison

tasks ranged from relatively simple judgments to more difficult ones. In one condition, stimulus pairs were briefly presented to only one side of the brain. In a second condition, stimulus pairs were presented so that each stimulus in the pair went to a different side of the brain. Here, participants obviously needed cooperation between the two sides of the brain to make a judgment. Of interest was whether performance would be better for a single hemisphere working alone (within-hemisphere activity), or for two hemispheres working together (between-hemispheres activity). For the simple tasks, measures of performance (reaction time and accuracy) revealed a clear within-hemisphere advantage. As task difficulty increased, however, performance was enhanced by hemispheric cooperation. This suggests that cooperation between the two halves of the brain on relatively simple tasks may not be necessary—and, in fact, may actually hinder efficient performance.

The results just described illustrate how the brain delegates its resources in situations involving *one* task. But how about more complex situations involving multiple tasks? After all, daily life often entails doing two or more things at once. Recent evidence suggests that the brain delegates its resources not only between its two hemispheres but also *within* each hemisphere (Boles, 1992). To test the possibility of multiple resources within each side of the brain, Boles and Law (1992) used a *dual-task procedure* in which study participants performed two tasks presented to one side of the brain simultaneously. Half the task pairs were constructed such that each task used the *same* cognitive resource; for the other half, pairs consisted of tasks that used different cognitive resources.

The results were consistent with the idea that each side of the brain contains multiple cognitive resources. A decrease in performance (such as increased reaction time) was observed for task pairs that used the *same* cognitive resource. In contrast, performance of task pairs that used *different* cognitive resources was not affected. Consider how these results might apply to a real-life example: Imagine that you are steering a car while listening to the emotional voice of your distraught friend riding next to you. While both of these tasks involve the right side of the brain, separate resources are used to recognize spatial position (where your car is going) and emotion. As a result, your driving ability is unlikely to suffer from this task combination. On the other hand, steering the car while scanning a mental image of a map may spell trouble, since both tasks involve checking spatial positions and call on the same hemispheric resource. To summarize, the results of numerous studies suggest that it *is* possible to do two things at once—as long as the tasks do not depend on the same hemispheric resource.

KEY POINTS

- In most persons, the left hemisphere specializes in verbal activities and in logical thought and analysis. The right hemisphere specializes in the comprehension and communication of emotion and in the synthesis of information.
- Evidence for hemispheric specialization has been obtained from studies of people with intact brains and from research with split-brain individuals.
- Within each hemisphere of the brain, cognitive processes may operate independently, allowing us to do two or more things at once—as long as the tasks do not depend on the same cognitive resource.

THE ENDOCRINE SYSTEM: *Chemical Regulators of Bodily Processes*

Earlier, I mentioned that the hypothalamus plays a key role in the activities of important glands. These are the **endocrine glands,** which release chemicals called **hormones** directly into the bloodstream. Hormones exert profound effects on a wide range of processes related to basic bodily functions.

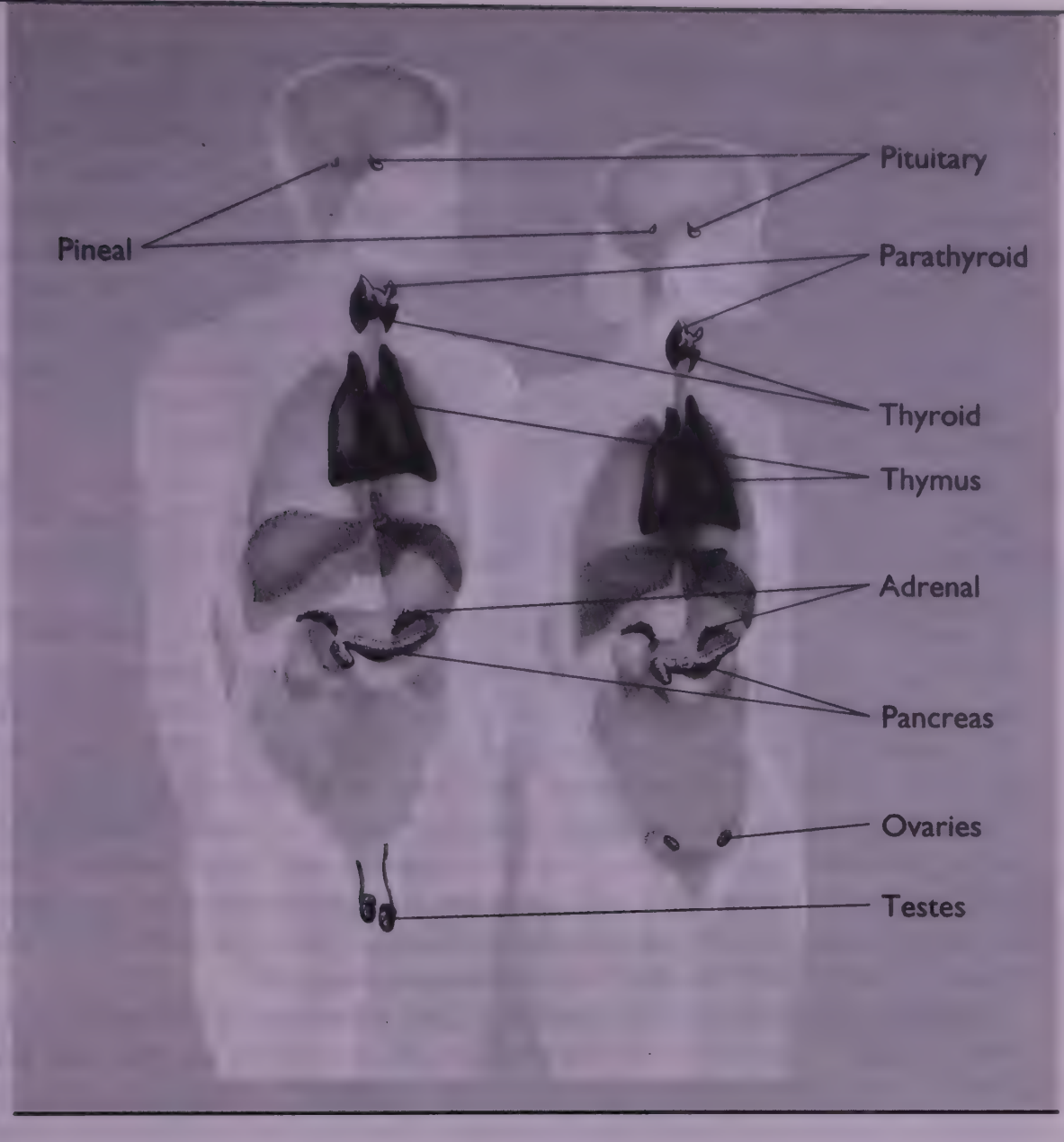


FIGURE 2.12

Location of the Endocrine Glands

Endocrine glands are found in several locations throughout the body. The hormones they release exert important effects on many bodily processes.

Of special interest to psychologists are *neurohormones*—hormones that interact with and affect the nervous system. Neurohormones, like neurotransmitters, influence neural activity. However, because they are released into the circulatory system rather than into synapses, they exert their effects more slowly, at a greater distance, and often for longer periods of time than neurotransmitters. The locations of the major endocrine glands are shown in Figure 2.12.

The relationships between the hypothalamus and the endocrine glands are complex. Basically, though, the hypothalamus exerts its influence through the *pituitary gland* (refer to Figure 2.12). This gland is located just below the hypothalamus and is closely connected to it. The pituitary is sometimes described as the master gland of the body, for the hormones it releases control and regulate the actions of other endocrine glands.

The pituitary is really two glands in one, the *posterior pituitary* and the *anterior pituitary*. The posterior pituitary releases hormones that regulate reabsorption of water by the kidneys and, in females, the production and release of milk. It is the anterior pituitary that releases the hormones that regulate the activity of other endocrine glands. One such hormone, ACTH, stimulates the outer layer of the adrenal gland, the *adrenal cortex*, causing it to secrete cortisone. Cortisone, in turn, affects cells in many parts of the body. The pituitary also secretes hormones that affect sexual development, govern the functioning of the sexual glands (regulating the amount of hormones they release), and help control basic bodily functions relating to metabolism and excretion.

Endocrine Glands: *Glands that secrete hormones directly into the bloodstream.*

Hormones: *Substances secreted by endocrine glands that regulate a wide range of bodily processes.*

A dramatic illustration of the importance of hormones secreted by the endocrine glands is provided by a disorder known as the *congenital adrenogenital syndrome (CAS)*. In this condition excessive levels of adrenal androgens (hormones that typically exist in higher concentrations in males than females) are produced. In males, this disorder merely accelerates the onset of puberty. In females, however, the syndrome has much more disturbing effects. A female suffering from this disorder is born with external sexual organs that are distinctly masculine in appearance. If her condition is recognized at birth and she receives corrective surgery plus hormonal treatment designed to reduce levels of androgens, the girl's development may proceed normally. If, however, she does not receive treatment until her teen years, she may retain some masculine characteristics; she may describe herself as a tomboy, prefer boys' clothes, and express little interest in babies or future maternity (Ehrhardt & Meyer-Bahlburg, 1981). Since many other females also demonstrate such tendencies, however, the meaning of these findings is somewhat difficult to interpret.

In another disorder, known as the *adrenogenic insensitivity syndrome*, the cells of genetic males lack receptors for androgens. Such persons are born with genitals that are distinctly female, and they develop as what appear to be normal females. As noted by Money and Ehrhardt (1972), their childhood play, goals, sexual behavior, and maternal interests all conform to patterns traditionally seen among females. However, these individuals are unable to have children, since they lack ovaries and other internal female sexual organs. Treatment for such persons includes surgical enlargement of the vagina and psychological counseling to help them cope with the fact that because of their condition, they cannot become pregnant.

Together, the adrenogenital syndrome and adrenogenic insensitivity syndrome suggest that hormones secreted by the endocrine glands, and especially by the *gonads* or sex glands, exert important effects on social and cognitive as well as physical development. However, as we'll see in chapter 8, the development of *gender identity*—individuals' recognition of their sex and the effects of such recognition on later development—is influenced by many social and environmental variables. Thus, the possible role of biological factors in this process should be viewed with considerable caution. Nevertheless, these syndromes underscore the importance of the endocrine glands and the various different hormones they secrete. Table 2.2 summarizes the major endocrine glands and their effects.

Hormones and Behavior: Is the Premenstrual Syndrome Real?

In general, the endocrine system functions similarly in females and males. There is one major exception to this pattern, however: Gonadal hormone levels remain fairly constant in males but change markedly in a rhythmic manner in young to middle-aged adult females. These changes are associated with the *menstrual cycle* and occur regularly over about twenty-eight days. As you probably know, this cyclicity is related to shifts in fertility.

Because shifts in gonadal hormones during the course of this cycle are very large, it has been assumed that these shifts may be related, in some fashion, to behavior or emotions. And indeed, many women report that their moods, energy level, and even sexual desire do seem to alter over the course of their menstrual cycle. For some women, these changes are most pronounced in the days just before the start of menstruation—an effect known as the *premenstrual syndrome* (PMS for short) (Hopson & Rosenfeld, 1984). Are these changes real? Perhaps, but research evidence suggests that in many

Gland	Effects or Functions It Regulates
Adrenal Glands	
Adrenal medulla	Produces *epinephrine* and *norepinephrine*. Both play an important role in reactions to stress (e.g., increases heartbeat, raised blood pressure).
Adrenal cortex	Produces hormones that promote release of sugar stored in the liver. Also regulates the excretion of sodium and potassium.
Gonads	
Ovaries	Produce hormones responsible for secondary sex characteristics of females (e.g., breast development); also regulate several aspects of pregnancy.
Testes	Produce hormones responsible for secondary sex characteristics of males (e.g., beard growth); also affect sperm production and male sex drive.
Pancreas	Produces hormones (e.g., insulin, glucagon) that regulate metabolism.
Parathyroid	Produces hormones that regulate levels of *calcium* and *phosphate* within the body (these substances play an important role in functioning of the nervous system).
Pituitary Gland	
Anterior	Controls activity of gonads; regulates timing and amount of body growth; stimulates milk production in females.
Posterior	Releases hormones that control contractions of uterus during birth and the release of milk from mammary glands; also regulates excretion of water.
Thyroid	Produces *thyroxin*, which regulates rate of metabolism and controls growth.

Table 2.2

The Endocrine System: A Summary of Its Major Effects

The various hormones released by the endocrine glands play major roles in body processes.

cases they may be smaller and less clear-cut than is often assumed. In fact, it appears that in many cases, reports of shifts in mood, energy, and symptoms may be more closely related to *beliefs* about such changes than to actual changes themselves. The mechanisms at work in this context are clearly illustrated by the findings of a revealing study by McFarland, Ross, and DeCourville (1989).

These researchers asked women to keep daily diaries in which they recorded a wide range of life events, changes in mood, and the presence of various physical symptoms such as cramps, headaches, and backaches. In addition, the women also completed a questionnaire designed to measure their beliefs about the impact of the menstrual cycle. On the basis of their replies to this questionnaire, participants were divided into two groups: those who believed strongly that the menstrual cycle influenced their mood and behavior, and those who did not hold such beliefs. The two groups were then asked to recall their diary entries for days during menstruation or at other points during their cycle. Results were clear: Women who believed strongly in the existence of PMS overreported physical symptoms and mood shifts on days during or just before menstruation. In other words, they reported more changes of this type than they had actually recorded in their daily diaries. In contrast, women who

Key Points

- Hormones released by the endocrine glands exert far-reaching effects on bodily processes and also on important aspects of behavior.
- Research findings suggest that women's beliefs and expectations about the premenstrual syndrome may play a more important role than gonadal hormones.
- Some evidence suggests a relationship between sex differences in the size of regions of the corpus callosum and sex differences in several cognitive abilities, including verbal fluency and language lateralization.
- Genetically based hormonal disturbances such as CAS may play a role in shaping gender-specific behaviors.

did not hold strong beliefs about PMS did *not* show such an exaggeration. Not surprisingly, the two groups did not differ when asked to recall their diary entries for other days.

These findings by no means imply that shifts in hormonal levels do not influence moods or behavior; on the contrary, other evidence indicates that such effects do occur (Pinel, 1993). However, the results obtained by McFarland and her colleagues indicate that the psychological and physical impact of hormones can be strongly influenced by expectations, beliefs, and other cognitive factors. It is hard to imagine a more compelling illustration of the fact that the biological processes that give rise to our conscious experience are, indeed, complex. For information on the possible role of biological factors in sex differences, please see the **Perspectives on Diversity** section.

Perspectives on Diversity

The Biological Basis of Gender Differences

Throughout this chapter, we've noted that basic biological processes underlie many aspects of our cognition and behavior. One age-old biological fact of life that has sparked a great deal of controversy in recent years, however, is sex. At issue is the relative contribution of a person's sex to differences in the way that men and women think, feel, and behave. (We'll consider such differences in detail in chapter 11.) During the past several decades, research has focused on identifying social and cultural factors that might explain the origin of these differences. If environmental factors—including social and cultural forces—could be shown to be the culprits, so the argument goes, then changing these factors should lead to the elimination of many gender-related differences. Consistent with these predictions, many gender-related differences *have* narrowed over the past few decades, reflecting changes in socialization, education, and employment practices that have occurred in this country.

Yet recent research suggests that differences in certain cognitive processes and behaviors of males and females still remain (e.g., Berenbaum & Hines, 1992; Law, Pellegrino, & Hunt, 1993). For example, men tend to score higher on tests of spatial ability, such as the ability to mentally rotate three-dimensional figures, and show greater language lateralization (hemispheric specialization) for processing verbal material than women do. Women, on the other hand, tend to hold a slight advantage over men on certain verbal tasks. How do psychologists attempt to explain such differences? One possibility is sex differences in the size of their brains.

Sex Differences in Brain Structure and Cognitive Processes

Recent evidence suggests that men and women do, in fact, differ in brain structure. For example, several studies have discovered sex differences in the size of certain brain structures, including the corpus callosum (Clarke et al., 1989). The corpus callosum is made up of more than 200 million nerve fibers and is the main link between the two hemispheres of the brain. Thus, it is not surprising that researchers would suspect the involvement of this structure in a variety of cognitive processes. In one recent study, Hines and her colleagues (1992) used MRI, a brain-imaging technique, to measure the size of several regions of the corpus callosum in twenty-eight women. Then they obtained measures of the women's cognitive abilities, including a verbal test and a test of language lateralization. They hypothesized that areas of the corpus callosum reported to be larger in women than in men would be positively related to the women's scores on tests on which women typically score higher (the

verbal test). In contrast, they predicted that areas reported to be larger in men than in women would be negatively related to the women's scores on tests on which men typically score higher (language lateralization). The results supported their predictions: There was a significant positive relationship between the women's scores on the verbal test and the size of a corpus callosum region reported to be larger in women. In contrast, a negative relationship was observed between scores on the language lateralization measure and the size of an area reported to be larger in men than in women. I should emphasize that these results are preliminary and should be interpreted with caution. They do not prove that differences in brain structure are the cause of the cognitive differences observed in this study. Still, they are provocative in that they raise interesting questions regarding the relationship between sex differences in brain structure and sex differences in cognitive processes and behavior.

The Role of Hormones in Gender-Related Behaviors

If the results of the preceding study are accurate, what then is the basis for sex differences in brain structure? Recent evidence suggests that basic biological processes that occur very early in our development—in fact, before we are born—may be involved. Earlier I touched on the curious genetically based disorder termed congenital adrenogenital syndrome (CAS), which appears to produce in girls behavior patterns typical of boys, due to high levels of adrenal androgens. Although it appears that these behaviors result from hormonal influences present before birth, it is also possible that environmental influences play a role as well. To illustrate this, consider a recent study by Berenbaum and Hines (1992). These researchers assessed differences in children's preferences for three types of toys: traditional boys' toys, girls' toys, or toys that were gender-neutral. The participants in the study were boys and girls between the ages of three and eight—including girls with CAS. At issue was the question of which toys the children would prefer to play with if given equal access to all three types. The results showed that CAS girls spent significantly more time playing with boys' toys than girls who did not have CAS. In fact, their preferences closely matched those of the boys.

An alternative explanation for these results is that parents of the CAS girls may have encouraged their daughters to behave like boys. In other words, because of their masculine features and tendencies at birth, parents of the CAS girls may have inadvertently treated them in a masculine fashion. Similarly, the other parents may have encouraged gender-specific behaviors in their children as well. However, measures taken to assess this possibility showed there were no differences among parents in their tendencies to encourage their children to behave in gender-specific ways. In short, these results suggest that biological processes may play a significant role in important aspects of human development.

Hormones: Shaping Gender-Specific Behaviors

Researchers are studying the effects of basic biological processes—including hormonal influences—on the development of sex-typed behaviors among children.

Heredity and Behavior

The basic theme of this chapter is straightforward: that behavior and consciousness are manifestations of complex biological processes within our bodies. If this is true, and virtually all psychologists assume that it is, then it certainly makes sense to consider the relationship of **heredity**—biologically determined characteristics—to behavior. After all, many aspects of our biological nature are inherited; so in an indirect manner, and always through the filter of our experience and environmental factors, heredity can indeed influ-

Heredity: *Biologically inherited characteristics.*

ence behavior (Rushton, 1989a and 1989b). In this final section, then, we'll examine several aspects of heredity that appear to be relevant to understanding the biological bases of behavior.

Genetics: Some Basic Principles

Every cell of your body contains a set of biological blueprints that enable it to perform its essential functions. This information is contained in **chromosomes,** strandlike structures found in the nuclei of all cells. Chromosomes are composed of a substance known as DNA, short for deoxyribonucleic acid. DNA, in turn, is made up of several simpler components arranged in the form of a double helix—something like the twisting water slides found by the sides of large swimming pools. Chromosomes contain thousands of **genes**—segments of DNA that serve as basic units of heredity. Our genes, working in complex combinations and in concert with forces in the environment, ultimately determine many aspects of our biological makeup (see Figure 2.13).

Remarkable progress has been made toward detecting genetic involvement in a variety of physical and mental disorders. For example, researchers recently discovered the gene that causes **Huntington's disease,** a rare, progressive neuromuscular disorder. Persons afflicted with Huntington's disease experience a gradual onset of uncontrollable, jerky movements in their limbs. Unfortunately, there is at present no cure for Huntington's disease (Pinel, 1993). Children of an affected person have a 50 percent chance of inheriting the gene that causes this disorder. Ironically, the onset of symptoms usually appears after age forty—long after many parents have their children, and therefore too late for them to reconsider their decision. Although scientists are not yet sure how the gene actually causes the disease, it is now possible to detect its presence before the onset of symptoms and, more importantly, in time to let parents avoid passing the lethal gene to their children.

Merely possessing a particular gene, however, does not ensure that a specific effect will follow. Genes do not control behavior or other aspects of life directly—they exert their influence only indirectly through their influence on chemical reactions in the brain or other organs. These reactions, in turn, may depend on certain environmental conditions. For example, consider **phenylketonuria (PKU),** a genetically based disorder in which persons lack the enzyme necessary to break down *phenylalanine*—a substance present in many foods. Affected persons on a normal diet tend to accumulate phenlalanine in their bodies. This, in turn, interferes with normal development of the brain and leads to mental retardation, seizures, and hyperactivity (Nyhan, 1987). Altering environmental conditions, however, can prevent this chain of events. Hospitals now routinely screen infants' blood for high levels of phenylalanine. If PKU is detected during the first few weeks of life, babies placed on a diet low in phenylalanine do not develop the PKU symptoms. Dietary restrictions can then be relaxed in late childhood after the majority of brain development is complete.

Most human traits, however, are determined by more than one gene. In fact, hundreds of genes acting in concert with environmental forces may be involved in shaping complex physical or cognitive abilities (Lerner, 1993; McClearn et al., 1991). At this point you are probably wondering, "Then how do psychologists tell which aspects of behavior are determined by genetic versus environmental factors—by heredity or by experience?" This question has been the source of debate among psychologists for many years and is often referred to as the *nature-nurture controversy,* an issue we will consider in greater detail below and again in subsequent chapters.

Chromosomes: *Threadlike structures containing genetic material, found in nearly every cell of the body.*

Genes: *Biological "blueprints" that shape development and all basic bodily processes.*

Huntington's Disease: *A genetically based fatal neuromuscular disorder characterized by the gradual onset of jerky, uncontrollable movements.*

Phenylketonuria (PKU): *A genetically based disorder in which a person lacks the enzyme to break down phenylalanine, a substance present in many foods. The gradual buildup of phenylalanine contributes to subsequent outcomes that include mental retardation.*

Most cells in the human body contain forty-six chromosomes, existing in pairs (refer to Figure 2.13). When such cells divide, the chromosome pairs split; then, after the cells have separated, each chromosome replicates itself so that the full number is restored. This kind of cell division is known as **mitosis**. In contrast, sperm and ova—the male and female sex cells, or *gametes*—contain only twenty-three chromosomes. Thus, when they join to form a fertilized ovum from which a new human being will develop, the full number (forty-six) is attained. For each of us, then, half of our genetic material comes from our mother and half from our father.

FIGURE 2.13

DNA: Mapping Our Genetic Heritage

Chromosomes are composed of DNA (deoxyribonucleic acid). Each human cell contains twenty-three pairs of chromosomes. The twenty-third pair determines sex. In males, the twenty-third pair contains one X and one Y chromosome (shown here); in females, the twenty-third pair contains two X chromosomes.

These basic mechanisms explain why persons who are related resemble one another more than persons who are totally unrelated, and also why the closer the familial tie between individuals, the more similar they tend to be physically. The closer such links are, the greater the proportion of chromosomes and genes family members share. And since genes determine many aspects of physical appearance, similarity increases with closeness of relationship. Thus, siblings (children of the same parents) tend to be more alike than cousins (the children of siblings). In the case of identical twins, or *monozygotic twins*, a single fertilized egg splits in two and forms two children. Because identical twins share all of their genes, they are usually remarkably similar in appearance. They are surprisingly similar in other respects as well, including their religious beliefs, their television viewing preferences, their grief responses (e.g., Segal & Bouchard, 1993), and even their risk for divorce. Psychologists have long known that there is an increased risk of divorce among the children of divorced parents, and data reported recently by McGue and Lykken (1992) indicate that genetic factors may play a role in this outcome. Briefly, they found that if one identical (monozygotic) twin was divorced, the probability that her or his twin would also divorce was higher than was true for nonidentical (dizygotic) twins. This suggests that there may be inherited tendencies that contribute to the likelihood of divorce. We'll consider what these might be in a more detailed discussion of this study (see chapter 9).

Disentangling Genetic and Environmental Effects: Research Strategies

Efforts to assess the relative roles of genetic and environmental effects on complex forms of behavior have often involved comparisons between identical twins who were separated early in life and raised in contrasting environments. As we've already noted, since such twins have identical genes, any differences between them must be due to contrasting experiences and environments. And to the extent that identical twins demonstrate similarity in various behaviors, despite being raised in different environments, the greater the contribution of genetic factors to such behaviors. Research of this type (e.g., Bouchard, 1987; Bouchard et al., 1990) has yielded some surprising findings. Even identical twins reared in very different environments show remarkable similarities (Lykken et al., 1992).

Mitosis: *Cell division in which chromosome pairs split and then replicate themselves so that the full number is restored in each of the cells produced by division.*

IDENTICAL TWINS

Identical twins not only look alike, they are surprisingly similiar in a variety of psychological aspects as well. Studies of identical twins separated at birth have yielded valuable information about the importance of genetic and environmental influences on behavior.

Perhaps the most startling evidence for such similarity is provided by a study conducted by Arvey and his colleagues (1989). These researchers asked thirty-four sets of identical twins to complete standard measures of job satisfaction—liking for their current jobs. Each pair of twins (average age forty-two) had been separated since they were only a few months old and had spent most of their lives in different homes, leading different lives. Despite this fact, and despite the fact that they held different jobs, there was a significant degree of similarity in their rated satisfaction: The higher the satisfaction reported by one twin, the higher the satisfaction reported by the other. Moreover, this relationship was not reduced even when corrections were made for possible similarities in the twins' jobs. (If they held similar jobs, then it would not be surprising for them to report similar levels of satisfaction.)

Arvey and his colleagues suggest these results may stem from tendencies to be positive and enthusiastic—characteristics already known to be partly determined by genetic factors (Tellegen et al., 1988). In other words, because of genetic factors, some people tend to experience positive moods more often than others, and these positive moods contribute to their level of satisfaction with their work. Whatever the mechanism involved, it seems clear that there may be a genetic component in many aspects of behavior—including sexual orientation, a possibility we'll consider in greater detail in the **Research Process** section below.

KEY POINTS

- Biological blueprints are contained in chromosomes, which, in turn, contain thousands of genes that can affect physical characteristics and aspects of behavior.
- Two well-known genetically based diseases are Huntington's disease and phenylketonuria (PKU).
- Research comparing identical twins raised apart suggests that genetic factors play a role in many aspects of behavior.

THE RESEARCH PROCESS

Sexual Orientation—Genetically Determined or Lifestyle Choice?

Determining the causes of behavior can be a complicated business. As I've noted throughout this section, doing so requires careful examination of both environmental and biological factors. But what about sexuality? Is a person's sexual orientation determined by genes and, therefore, immutable? Or does it stem from powerful influences in the environment and, therefore, remain subject to change? These and similar questions form the basis of one of the most emotionally charged issues of the 1990s—sexual orientation.

Most people are *heterosexual*; they direct their sexual energies toward members of the opposite sex. However, a small but significant portion of the population—about 4 percent of the adult population—is *homosexual*; these individuals direct their sexual behavior predominantly to members of their own sex (Haas & Haas, 1993). How is a person's sexual orientation established?

The Search for Precursors to Homosexuality

Researchers initially focused on identifying ways in which homosexual persons differed from their heterosexual counterparts, including hormonal levels, quality of family and social relationships, and the nature of their early sexual experiences. None of these factors seemed to differentiate reliably among persons in these groups. In fact, most research has shown that homosexual persons, as a group, are very similar to heterosexual persons—except in their sexual orientation (Haas & Haas, 1993).

Then the results of a large-scale survey seemed to suggest a new possibility. In their study, Bell, Weinberg, and Hammersmith (1981) conducted interviews with homosexual and heterosexual men and women who answered questions regarding aspects of their childhood, adolescence, and adult life. Most of the survey items did not indicate differences between homosexual and heterosexual people. But there was one important difference: Homosexual women and men consistently expressed the feeling that they *knew they were different* in some way from their same-sex peers—even during their childhood.

Evidence for a Biological Basis of Sexual Orientation

That these persons were aware of being different at such a young age seemed to point toward the possiblity of a biological or genetic component in sexual preference. As a result, researchers began to devise ways to explore this possibility.

In one intriguing study, LeVay (1991) enlisted the assistance of some very unlikely research participants—forty-one cadavers, including nineteen homosexual men, sixteen heterosexual men and six heterosexual women. His purpose? To compare the relative size of a small cluster of cells located in the hypothalamus of their brains. Prior research had revealed that damage to this region of the hypothalamus in male monkeys destroyed their interest in female monkeys—but not their sex drive. LeVay reasoned that if a similar mechanism existed in humans, he could expect to find differences in the relative sizes of similar brain structures in his research participants. LeVay's measurements showed that the cluster of cells was more than twice as large in the brains of the heterosexual men as in those of the heterosexual women or the homosexual men.

But does this finding prove that the observed difference in homosexual men's brain structures *caused* their sexual orientation? Not necessarily, since it is possible that the reverse is true: that their sexual orientation led to a change in brain structure. LeVay's findings also leave a key question unanswered: How did the size difference develop? One possibility is that the men differed biologically—perhaps in terms of their genes.

To explore this prospect, Bailey and Pillard (1991) recruited 161 gay men, each of whom had an identical twin, a nonidentical male twin, or an adopted brother. At issue was the likelihood that the brothers would also be gay. Bailey and Pillard reasoned that if homosexuality had a genetic component, then concordance for homosexuality would be highest among the identical twins. As shown in Figure 2.14 on page 82, 52 percent of the identical twins were both gay, compared to 22 percent and 11 percent of the nonidentical twins and adopted brothers, respectively. Would these findings also apply to women? Using similar procedures, Bailey and Pillard (1993) found similar results for a group of 147 gay women: 48 percent of the identical twins were both gay, compared to 16 percent of the nonidentical twins and 6 percent of the adopted sisters (see Figure 2.14). Although these results strongly suggest a genetic component in sexual orientation, critics attribute them to environmental factors, since nearly half of the siblings of gay identical twins were *not* gay.

Perhaps the most intriguing evidence in this regard, however, comes from a study (Hamer et al., 1993) that attempted to locate a possible homosexuality gene. Hamer and his colleagues began their search by tracing the family histories of seventy-six gay men to determine which, if any, of their male relatives were also gay. To their surprise, homosexuality was much more

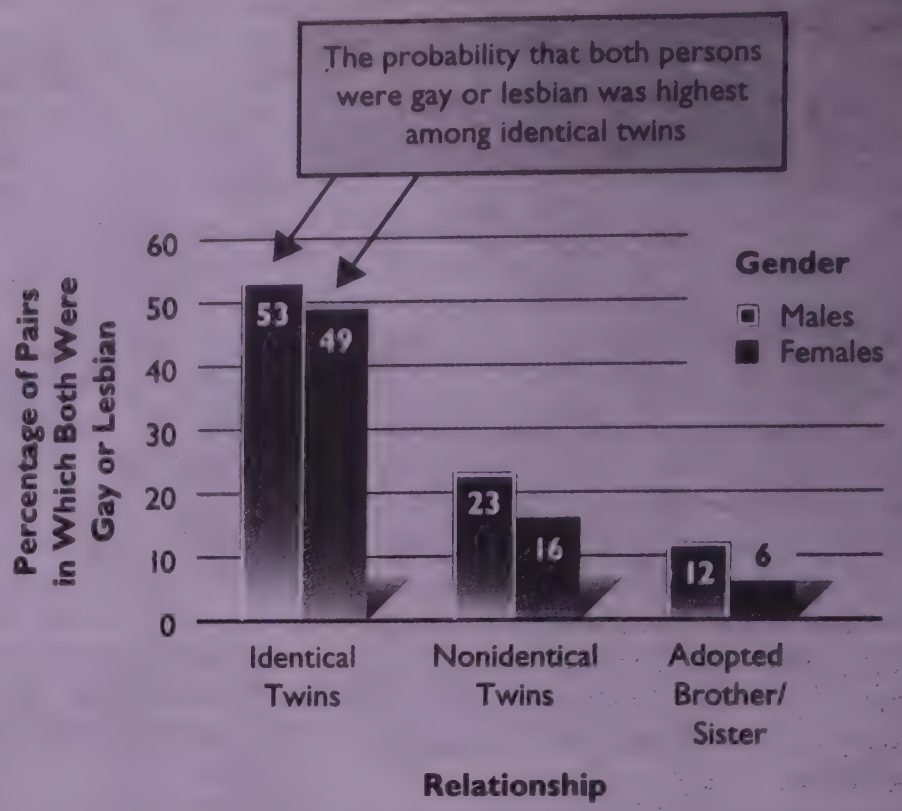
Sexual Orientation: Genetically Determined or Lifestyle Choice?

Recent research suggests that biological processes are involved in shaping a person's sexual orientation.

FIGURE 2.14

The Role of Heredity in Sexual Orientation

Recent evidence suggests that sexual orientation may have a genetic component. Here, the probability that identical twins were *both* gay or lesbian was higher than for persons less closely related: that is, nonidentical twins and adopted siblings.
(*Source:* Based on data from Bailey & Pillard, 1993.)



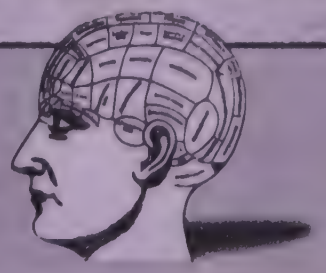
common among male relatives on the men's mothers' side of the family. This finding suggested that the gene might be passed through female members of the family and hinted, in turn, that the gene might be located on the X chromosome—the only chromosome inherited exclusively from the mother. Next, the researchers obtained DNA samples from forty pairs of homosexual brothers and performed a **genetic linkage analysis**—a procedure used to determine the location of specific genes based on their proximity to known reference points on the chromosome referred to as "genetic markers." On average, two brothers have about half the DNA on their chromosomes in common. Thus, if brothers are homosexual because they inherit a common gene from their mother, then the gene must be located somewhere in a shared section of the X chromosome. The shared section, in turn, can be identified via the location of known "markers." Interestingly, thirty-three of the forty pairs of brothers shared a set of markers located in an area of the X chromosome named Xq28—a much higher rate than would be expected to occur by chance. These results provide the strongest evidence to date for genetic involvement in sexual orientation. However, they should be viewed as preliminary, requiring replication by other researchers in different laboratories. Moreover, it is unlikely that all homosexuality is related to a single gene. Because seven of the pairs did not share a common set of markers, it is likely that additional mechanisms—perhaps genetic *and* environmental ones—contribute to sexual orientation.

Genetic Linkage Analysis: *A procedure used to determine the location of specific genes based on their proximity to known reference points on chromosomes.*

CRITICAL THINKING QUESTIONS

1. LeVay's results and, therefore, the conclusions he reached regarding the role of the hypothalamus in sexual orientation were based on a small sample of subjects. Also, most of the males had died from AIDS. In your view, do these limitations negate the value of LeVay's findings?
2. The findings of the studies by Bailey and Pillard and by Hamer and his colleagues converge on the idea that biological processes are involved in shaping sexual orientation. What other factors not considered by these studies may contribute to sexual orientation?
3. The discovery of a genetic marker for homosexuality raises several ethical issues. For example, it is possible that prospective parents could use genetic tests as screening devices. Some might even choose to terminate a pregnancy. Should genetic information be made available to parents? If so, why? If not, why?

Making Psychology Part of Your Life



Traumatic Brain Injury: Using Psychology to Enhance Quality of Life

If you were asked to guess the odds that you will be involved in a life-threatening accident during your lifetime, what would you guess? You may be surprised to learn they are fifty-fifty. In fact, one of the biggest threats facing young adults is severe trauma to some portion of their nervous systems—from severe blows sustained in contact sports such as hockey or football, to injuries sustained in automobile crashes. Because of the prevalence of these traumas, the chances are likely that you may even know someone who has suffered such an injury.

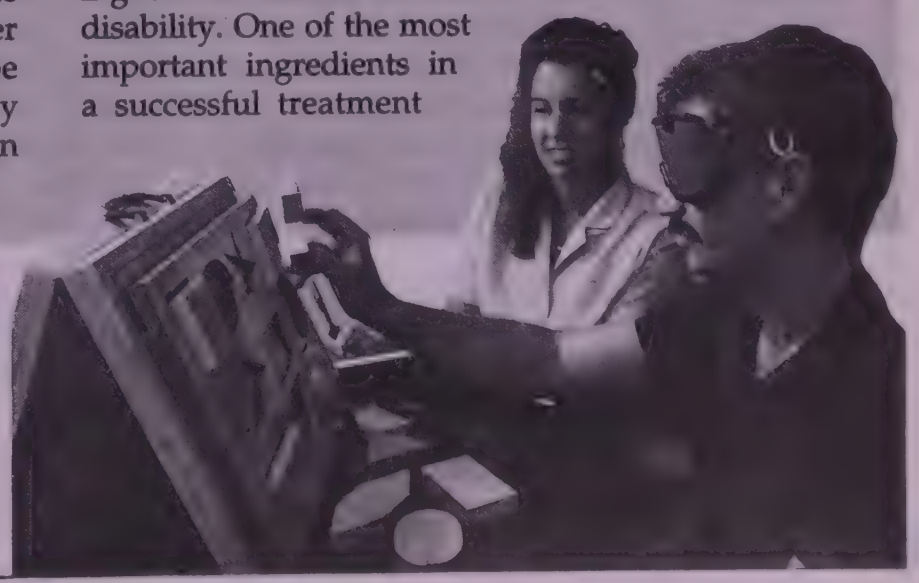
After having read this chapter, you should have no trouble understanding why a discussion of brain injuries is included here. There is an intimate relationship between the nervous system and the capacity to think, feel, and behave, and damage to the brain will have corresponding effects on all of these abilities. In other words, the consequences of injury to the brain aren't confined to the *physical* repercussions of injury-producing events, but often result in profound *psychological* ones as well. Indeed, some people who have sustained such injuries report that in certain respects, living with a damaged brain can be a fate *worse* than death.

The term often used to refer to severe instances of head injury, *traumatic brain injury (TBI)*, emphasizes that the brain has been damaged secondary to extreme forces applied to the skull and its contents (Prigatano, 1992). The damages that result from TBI are often diffuse and variable in scope. Some portions of the damage may be extensive enough to be discovered by brain-imaging devices, whereas others may be microscopic and thus escape detection. The damage also tends to extend to regions throughout the brain, making it difficult for psychologists and other health professionals to predict with precision the type or extent of psychological disturbances that are likely to occur. This, in turn, makes it difficult to design effective treatments for persons who have sustained a TBI (Armstrong, 1991).

Reports of the disturbances affecting TBI patients show several common features. Interestingly, though, each disturbance is associated with curious inconsistencies. For example, the most prevalent consequence of a brain injury is irritability, the tendency to become easily annoyed or upset. As many as 70 percent of TBI patients exhibit this tendency. Ironically, the extent of irritability does *not* appear to be related to the extent of damage to the brain. A similar inconsistency is related to another common feature of TBI—motivation. Although TBI patients typically become apathetic following brain injury, they may suddenly become explosively angry. Finally, TBI patients tend to lack a sense of self-awareness regarding their condition, but may become quite disturbed when their new limitations are pointed out to them (Prigatano, 1992).

What is the basis for the observed inconsistencies in behavior patterns associated with TBI? The root cause appears to be an inability to cope with environmental demands that these persons could have handled with ease prior to their injury. For instance, they may have a difficult time solving even simple problems, and as a result, they often become frustrated and emotionally overwhelmed.

Based on this discovery, psychologists have developed rehabilitation programs that attempt to accommodate the unique circumstances of brain-injured people (Armstrong, 1991). Indeed, the most successful programs to date focus on creating environments that are flexible to the needs of each person, depending on the nature of their disability. One of the most important ingredients in a successful treatment



Injuries to the brain can often produce widespread physical and psychological problems. New insights into the relationship between biological processes and behavior have led to exciting new programs to enhance the quality of life of brain-injured people.

program appears to be *structure*: an environment arranged to reduce frustration and increase the probability the person's efforts to cope will meet with success. For example, a common source of frustration among brain-injured persons is the inability to anticipate future events. Providing a structure that allows these persons to focus their efforts one step at a time increases the chances they will meet with success. This sets the stage for greater accomplishments later on. Another advantage of imposing structure is that it limits the number of things these persons must attend to at one time, and thereby reduces the confusion (and frustration) TBI patients experience while making choices. A final—but critical—ingredient of successful treatment of TBI has to do with how the intervention is applied; the chances of success are increased when treatment begins soon after injury, when family members are actively involved, and when the procedures are applied consistently over time.

In short, thanks to advances in understanding the complex interaction between biological processes and behavior, psychologists can improve the quality of life among persons who have suffered traumatic brain injury. It's important to realize, however, that the approach outlined here helps persons who have suffered TBI to deal with their disabilities more effectively—it does not *restore* their former physical and cognitive abilities. Therefore, the most effective way to prevent TBI from happening to you is to avoid dangerous situations, such as driving drunk or riding with someone who has been drinking, and to be consistent in using protective equipment, such as safety belts or helmets, when appropriate.

Summary and Review of Key Points

Neurons: Building Blocks of the Nervous System

Key Terms:

biopsychology, p. 46
neurons, p. 47
axon, p. 47
dendrites, p. 47
glial cells, p. 47
axon terminals, p. 47
synapse, p. 47
action potential, p. 48
nodes of Ranvier, p. 49
graded potentials, p. 49
synaptic vesicles, p. 49
neurotransmitters, p. 49
agonist, p. 54
antagonist, p. 54

- Biopsychology is the term used to refer to the field in psychology concerned with discovering the biological processes that give rise to our thoughts, feelings, and actions.
- Neurons are cells specialized for receiving, processing, and moving information. They are made up of a cell body, an axon, and one or more dendrites. Information transmission in the nervous system depends on the movement of positively and negatively charged ions across the neuron's cell membrane. Glial cells produce neurons' myelin sheath.
- Action potentials—rapid changes in the electrical properties of the cell membranes of neurons—constitute the basic mechanism by which information moves through the nervous system.
- Graded potentials vary in proportion to the size of the stimulus that produced them and function over relatively short distances, usually along the dendrite toward the cell body.
- Neurons communicate across the tiny gaps that separate them by means of neurotransmitters—complex chemicals that can depolarize or polarize the membranes of other cells they reach.
- Neurotransmitters produce one of two effects: Excitatory effects cause a depolarization in the nerve cell membrane, making it more likely that the cell will "fire"; inhibitory effects hyperpolarize the cell membrane, making a graded potential less likely.
- Many drugs produce their effects by influencing synaptic transmission. Drugs that mimic the effects of neurotransmitters are termed agonists; drugs that inhibit their effects are termed antagonists.
- Growing evidence suggests that knowledge of neurotransmitter systems can be applied to solve important practical problems, including drug and alcohol abuse and certain mental disorders.

The Nervous System: Its Basic Structure and Functions

Key Terms:

nervous system, p. 55
central nervous system, p. 55
peripheral nervous system, p. 55
somatic nervous system, p. 57
autonomic nervous system, p. 57
sympathetic nervous system, p. 57
parasympathetic nervous system, p. 57
electroencephalography (EEG), p. 59
magnetic resonance imaging (MRI), p. 59
SQUID (superconducting quantum interference device), p. 59
positron emission tomography (PET), p. 59

- The central nervous system (CNS) consists of the brain and spinal cord.
- The spinal cord carries sensory information to the brain via afferent nerve fibers and carries information from the brain to muscles and glands via efferent nerve fibers. It also plays a key role in reflexes.
- The peripheral nervous system consists of the somatic and autonomic nervous systems. The somatic nervous system connects the CNS to voluntary muscles throughout the body. The autonomic nervous system connects the CNS to internal organs and glands and to muscles over which we have little voluntary control.
- The autonomic nervous system consists of two parts: The sympathetic nervous system prepares the body for using energy. The parasympathetic nervous system activates processes that conserve the body's energy.
- Psychologists use a variety of methods to study the nervous system, including observing the effects of damage, electrical or chemical stimulation of the brain, and modern imaging techniques. Imaging techniques have proved useful in detecting brain abnormalities associated with certain mental disorders.
- PET scans have been used to show how the brain's activities change with experience. For example, the brain appears to expend less energy as it learns to master a task.

THE BRAIN: WHERE CONSCIOUSNESS IS MANIFEST Key Terms: medulla, p. 62 pons, p. 62 reticular activating system, p. 62 cerebellum, p. 62 midbrain, p. 62 hypothalamus, p. 63 pituitary gland, p. 63 thalamus, p. 63 limbic system, p. 63 cerebral cortex, p. 64 frontal lobe, p. 64 parietal lobe, p. 64 occipital lobe, p. 64 temporal lobe, p. 65 Wernicke-Geschwind theory, p. 66	• The brain stem, which includes the medulla, pons, and cerebellum, is concerned primarily with the regulation of basic bodily functions. • The hypothalamus and thalamus are involved in the regulation of motivated behavior and in emotion. • The hypothalamus plays a role in the regulation of eating. Damage to the ventromedial hypothalamus increases food intake because of its dramatic impact on metabolism. Damage to the lateral hypothalamus reduces food intake because of a general reduction in responsiveness to all sensory stimuli. • The cerebral cortex is the hub for higher mental processes, such as thinking, language, planning, reasoning, and memory. The association areas of the cerebral cortex may play an important role in integrating the input from many other areas of the brain. • The way in which the brain processes language and other complex mental events is most accurately represented by parallel models—ones suggesting that neural information moves along several routes and is processed in different regions of the brain simultaneously.
LATERALIZATION OF THE CEREBRAL CORTEX: TWO MINDS IN ONE BODY? Key Terms: lateralization of function, p. 68 corpus callosum, p. 70	• The two hemispheres of the brain are somewhat specialized for performing different functions, but this specialization is far from absolute. • In most persons, the left hemisphere specializes in verbal activities and in logical thought and analysis. The right hemisphere specializes in the comprehension and communication of emotion, and in the synthesis of information. • Evidence for specialization of the cerebral hemispheres has been obtained both from studies of persons with intact brains and from studies of persons whose corpus callosum has been separated through surgical operation. • Within each hemisphere of the brain, cognitive processes may operate independently, allowing us to do two or more things at once—as long as the tasks do not depend on the same cognitive resource.
THE ENDOCRINE SYSTEM: CHEMICAL REGULATORS OF BODILY PROCESSES Key Terms: endocrine glands, p. 73 hormones, p. 73	• Hormones released by the endocrine glands exert far-reaching effects on bodily processes and also on aspects of behavior. • Some evidence suggests a relationship between sex differences in the size of regions of the corpus callosum and sex differences in several cognitive abilities, including verbal fluency and language lateralization. • Research findings suggest that women's beliefs and expectations concerning PMS may play a more important role than hormones. • Congenital adrenogenital syndrome (CAS) results from the excess production of androgen by the adrenal glands. Females born with CAS may have masculinized sexual organs. Left untreated, these girls take on masculine features. • Genetically based hormonal disturbances such as CAS may play a role in shaping gender-specific behaviors.
HEREDITY AND BEHAVIOR	• Each of the body's cells has a set of biological blueprints that enable it to perform its essential functions. This information is contained in chromosomes, which in turn contain thousands of genes that can strongly affect physical characteristics and aspects of behavior.

Key Terms:	• Two well-known genetically based diseases are Huntington's disease and phenylketonuria. Huntington's disease is a fatal, progressive neuromuscular disorder that causes uncontrollable movements. In phenylketonuria (or PKU) persons lack the enzyme to break down phenylalanine. PKU can produce retardation, seizures, and hyperactivity, but can be prevented by a diet that restricts phenylalanine. • The relative contribution of genetic and environmental factors to aspects of behavior has been assessed through studies of identical twins raised apart. • Converging lines of research—twin research, anatomical studies of the hypothalamus, and genetic linkage analysis—provide evidence that sexual orientation may be influenced by genetic factors.
heredity, p. 77 chromosomes, p. 78 genes, p. 78 Huntington's disease, p. 78 phenylketonuria (PKU), p. 78 mitosis, p. 79 genetic linkage analysis, p. 82	

Critical Thinking Questions

Appraisal	Throughout this chapter, you've seen that our thoughts, feelings, and actions all stem from basic biological processes. Do you think that all of our conscious experience can be reduced to electrochemical events? If so, why? If not, offer an alternative view.
Controversy	Growing evidence suggests that sexual orientation may be linked to genetic processes and may not simply be a lifestyle choice. Given this strong possibility, what ethical and social implications does this hold? A related issue pertains to the possibility that scientists will soon be able to determine if genetic abnormalities are present in the developing fetus. What ethical issues does this raise? What are your views on these issues?
Making Psychology Part of Your Life	Perhaps you know someone who has suffered traumatic brain injury. Now that you understand the difficult path such a person faces during rehabilitation, can you think of ways in which you can use the information in this chapter to improve the TBI patient's quality of life?

Sensation and Perception:

Making Contact with the World Around Us

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- *Sensory Adaptation: "It Feels Great Once You Get Used to It"*

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3

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Have you ever wondered why certain smells trigger scenes long forgotten? Why does bathwater that initially "scalds" feel soothing only moments later? Do you know why the moon appears large on the horizon but smaller overhead? Do you believe in ESP? If you've wondered about issues like these, you're already aware that making sense of the world around us is a complicated business. Indeed, the mystery of how we sense and interpret events in our environment constitutes one of the oldest fields of study in psychology. Careful psychological research conducted over decades has shown that we do not

understand the external world in a simple, automatic way. Rather, we actively construct our interpretation of sensory information through several complex processes.

To clarify how we make sense of the world around us, psychologists distinguish between two key concepts: sensation and perception. The study of **sensation** is concerned with the initial contact between organisms and their physical environment. It focuses on describing the relationship between various forms of sensory stimulation (including electromagnetic, sound waves, pressure) and how these inputs are registered by our sense organs (the eyes, ears, nose, tongue, and skin).

In contrast, the study of **perception** is concerned with identifying the processes through which we interpret and organize sensory information to produce our conscious experience of objects and object relationships. It is important to remember that perception is not simply a passive process of decoding incoming sensory information. If this were the case, we would lose the richness of our everyday stream of conscious experiences. For example, consider the picture in Figure 3.1. At first glance, you probably will notice the red fox in the snow among the aspen trees. Closer inspection, however, reveals Native Americans on horseback quietly making their way through the wintry scene. This is an example of the active and complex process of perception. The information supplied by your senses remained constant, yet your interpretation of this sensory input shifted dramatically.

MAKING SENSE OF THE WORLD AROUND US IS A COMPLICATED BUSINESS.

The dual processes of sensation and perception play a role in virtually every topic we will consider in later chapters. For this reason, we will devote careful attention to them here. We'll begin by exploring in detail how the receptors for each sensory system transduce raw physical energy into an electrochemical code. As we'll soon note, our sensory receptors are exquisitely designed to detect various aspects of the world around us. As part of our discussion, we'll consider the role of cultural factors in one very important aspect of our sensory processes—the sensation of pain. Next, we'll turn our attention to the active process of perception. Here, we'll focus on how the brain integrates and interprets the constant flow of information it receives from our senses. In our discussion of perception, we'll also consider the relative contributions of heredity and experience to our perception of the world around us. Finally, we'll conclude by examining the evidence supporting one intriguing aspect of perception—the possibility of extrasensory perception, or *psi*.

Sensation: *Input about the physical world provided by our sensory receptors.*

Perception: *The process through which we select, organize, and interpret input from our sensory receptors.*

FIGURE 3.1

The Active and Complex Process of Perception

"Woodland Encounter" by Bev Doolittle illustrates how the dual processes of sensation and perception help us make sense of the world around us.
(*Source*: © 1981, The Greenwich Workshop, Inc. Reproduced with the permission of the Greenwich Workshop, Inc. For information please call 1-800-243-4246.)

SENSATION: The Raw Materials of Understanding

The sight of a breathtaking sunset, the taste of ice-cold lemonade on a hot day, the piercing sound of heavy metal music, the soothing warmth of a steamy bath—exactly how are we able to experience these events? As you may recall from chapter 2, all of these sensory experiences are based on complex processes occurring within the nervous system. This fact highlights an intriguing paradox: Although we are continually bombarded by various forms of physical energy, including light, heat, sound, and smells, our brain cannot directly detect the presence of these forces. Rather, it can only respond to intricate patterns of action potentials conducted by *neurons*, special cells within our bodies that receive, move, and process sensory information. Thus, a critical question is how the many forms of physical energy impacting our sensory systems are converted into signals our nervous system can understand.

Highly specialized cells known as **sensory receptors**, located in our eyes, ears, nose, tongue, and elsewhere, are responsible for accomplishing this coding task. Thus, sights, sounds, and smells that we experience are actually the product of **transduction**, a process in which the physical properties of stimuli are converted into neural signals that are then transmitted to our brain via specialized sensory nerves. To illustrate how our nervous system makes sense out of the surging sea of physical energies in our environment, we'll begin by focusing on two critical concepts: *thresholds* and *sensory adaptation*.

SENSORY THRESHOLDS: How Much Stimulation Is Enough?

Although we are immersed in sensory information, we thrive rather than drown. Our bodies seem well prepared to deal with this ocean of information; so well prepared that when deprived of all sensory input—in a condition termed *sensory deprivation*—our bodies may produce hallucinations to fill the void (Sekuler & Blake, 1990). But what is the slightest amount of stimulation that our sensory systems can detect? In other words, how much physical stimulation is necessary in order for us to experience a sensation? Actually, it turns out to be impressively low for most aspects of sensation. As shown in Table 3.1, we can hear a watch tick twenty feet away in a quiet room; we can smell a single drop of perfume in an empty three-room apartment; and on a clear dark night, we can see a lighted candle thirty miles away (Galanter, 1962).

Sensory Receptors: *Cells specialized for the task of transduction—converting physical energy (light, sound) into neural impulses.*

Transduction: *The translation of physical energy into electrical signals by specialized receptor cells.*

SENSE	ABSOLUTE THRESHOLD EQUIVALENT
Vision	Candle thirty miles away on a clear, dark night
Hearing	Tick of a watch twenty feet away in a quiet room
Taste	Teaspoon of sugar dissolved in two gallons of water
Smell	One drop of perfume in a three-room apartment; a single molecule of an odorous substance
Touch	A bee's wing falling on the cheek from a height of one centimeter
Warmth or cold	A one-to two-degree (Celsius) change in skin temperature

TABLE 3.1

Absolute Thresholds for Each of Our Senses

The sensitivity of each of our senses is remarkable.
(*Source*: Based on Galanter, 1962.)

Although our receptors are remarkably efficient, they do not register all the information available in the environment at any given moment. We are able to smell and taste certain chemicals but not others; we hear sound waves only at certain frequencies; and our ability to detect light energy is restricted to a relatively narrow band of wavelengths. The range of physical stimuli that we and other species can detect seems to be designed in a way that maximizes survival potential (Coren & Ward, 1989).

Absolute Thresholds: "Was It Really There? For more than a century, psychologists have conducted studies to determine the level of sensitivity in each sensory system. To do this, they have used a variety of procedures called *psychophysical methods*. These procedures allow psychologists to determine the smallest magnitude of a stimulus that can be reliably discriminated from no stimulus at all 50 percent of the time; this is called the **absolute threshold**. To understand how absolute thresholds for our sensory systems have been explored, consider the following example. Suppose researchers at the Jaw Breaker Chewing Gum Company have discovered a new way to make the flavor in gum last forever. The process is simple and inexpensive but has a minor flaw: A critical ingredient, substance SOUR, escapes detection when in low concentrations, but in larger concentrations makes the gum taste terrible.

To determine the absolute threshold for detection of SOUR, Jaw Breaker researchers select several concentrations; the lowest is clearly below threshold (nobody tastes the SOUR), and the highest causes the tasters to spit out the gum. Then volunteers chew many samples of gum with different concentrations of SOUR. The concentration at which the volunteers detect SOUR 50 percent of the time is the absolute threshold, suggesting that the concentration of SOUR in the final product should fall *below* this level.

Absolute Thresholds: Some Complications We often assume there is a direct relationship between the presence of a physical stimulus and the resulting sensation. Thus, given a stimulus of sufficient intensity, we should always be able to detect its presence. Unfortunately, as shown in the SOUR example, this relationship is not so simple. Why? One reason is that our sensitivity to stimuli changes from moment to moment. A stimulus we can detect at one time will not necessarily be detected later. For this reason, psychologists have arbitrarily defined the absolute threshold as that magnitude of physical energy we can detect 50 percent of the time.

Although this definition takes account of fluctuations in our sensitivity to various stimuli, it does not explain *why* such fluctuations occur. There are actually several reasons. First, aspects of our body's functions are constantly changing in order to maintain our body's internal environment at optimal levels, a state termed *homeostasis*. It is not surprising that as a result of these changes, the sensitivity of our sensory organs to external stimuli also varies. Second, motivational factors such as the rewards or costs associated with detecting various stimuli also play a role. For example, the outcome of the SOUR study might have changed if the participants had been faced with the prospect of being fired for a "wrong" decision.

Absolute Threshold: *The smallest amount of a stimulus that we can detect 50 percent of the time.*

Signal Detection Theory: *A theory suggesting that there are no absolute thresholds for sensations. Rather, detection of stimuli depends on their physical energy and on internal factors such as the relative costs and benefits associated with detecting their presence.*

Signal detection theory suggests that complex decision mechanisms are involved whenever we try to determine if we have or have not detected a specific stimulus (Swets, 1992). For instance, imagine that you are a radiologist. While scanning a patient's X-ray, you think you detect a faint spot on the film, but you're not quite sure. What should you do? If you conclude that the spot is an abnormality, you must order more scans or tests—an expensive and time-consuming alternative. If further testing reveals an abnormality,

such as cancer, you may have saved the patient's life. If no abnormality is detected, though, you'll be blamed for wasting resources and unnecessarily upsetting the patient. Alternatively, if you decide the spot is *not* an abnormality, then there's no reason to order more tests. If the patient remains healthy, then you've done the right thing. If the spot is really cancerous tissue, however, the results could be fatal.

Your decision in this scenario is likely to be influenced by the rewards and costs associated with each choice alternative. Because of the potentially deadly consequences, you may be tempted to order more tests—even if the spot on the X-ray is extremely faint. But what if you are new on the job and you have just gone deeply into debt buying a house for your growing family? The fear of making a foolish decision that could cost you your job may weigh more heavily in the balance; you may not report the spot unless you are quite certain you saw it.

In summary, deciding whether we have detected a given stimulus is not always easy. These decisions often involve much more than a simple determination of the relationship between amount of physical energy present in a stimulus and the resulting psychological sensations.

Difference Thresholds: Are Two Stimuli the Same or Different?

A good cook tastes a dish, then adds salt to it, then tastes it again to measure the change. This illustrates another basic question relating to our sensory capacities: How much change in a stimulus is required before a shift can be noticed? Psychologists refer to the amount of change in a stimulus required for a person to detect it as the **difference threshold**. Obviously, the smaller the change we can detect, the greater our sensitivity. In other words, the difference threshold is the amount of change in a physical stimulus necessary to produce a **just noticeable difference (jnd)** in sensation. As it turns out, our ability to detect differences in stimulus intensity depends on the magnitude of the initial stimulus; we easily detect even small changes in weak stimuli, but we require much larger changes before we notice differences in strong stimuli. If you are listening to your favorite tunes at a low sound intensity, even small adjustments to the volume are noticeable. But if you are listening to very loud music, much larger changes are required before a difference is apparent. As you might guess, we are also more sensitive to changes in some types of stimuli than to changes in others. For example, we are able to notice very small shifts in temperature (less than one degree Fahrenheit) and in the pitch of sounds (a useful ability for people who tune musical instruments), but we are somewhat less sensitive to changes in loudness or in smells.

Stimuli below Threshold: Can They Have an Effect?

For decades **subliminal perception** has been a source of controversy. The question is whether we can sense or be affected by subthreshold stimuli that remain outside our conscious awareness (Greenwald, 1992; Merikle, 1992). Subliminal perception first captured the public's attention in the 1950s when a clever marketing executive announced he had embedded subliminal messages like "Eat popcorn" and "Drink Coke" into a then popular movie. Supposedly, the embedded messages were flashed on the movie screen so briefly (a fraction of a second) that audience members were not aware of them. Popular press reports claimed that sales of both products in theater lobbies increased substantially right after the messages (Brean, 1958). Although the executive later confessed to the hoax (no messages were actually presented), many people remained convinced that subliminal messages could be powerful sources of persuasion.

During the 1980s, public attention was again drawn to the issue of subliminal perception when concerned parents and religious leaders expressed out-

Difference Threshold: *The amount of change in a stimulus required before a person can detect the shift.*

Just Noticeable Difference (jnd): *The smallest amount of change in a physical stimulus necessary for an individual to notice a difference in the intensity of the stimulus.*

Subliminal Perception: *The presumed ability to perceive a stimulus that is below the threshold for conscious experience.*

SENSORY ADAPTATION

Have you ever jumped into the icy waters of a mountain lake or the ocean? At first the water feels freezing, but later it feels refreshing. This an example of sensory adaptation.

rage over the presence of "evil messages" recorded backward (this is known as backward masking) and embedded into songs on rock albums. The issue came to a head in a highly publicized trial in which the heavy metal band Judas Priest was accused of embedding subliminal satanic messages promoting suicide on their album *Stained Class*. The subliminal messages—which told listeners to "do it"—were alleged to be instrumental in the shotgun suicides of two young men. The judge in the case dismissed the charges against the rock band, citing a lack of scientific evidence that the subliminal messages actually *caused* the shootings (*Vance et al. v. Judas Priest et al.*, 1990).

Is it possible that subliminal satanic messages can lead unsuspecting youthful listeners down a path of loose morality and aberrant behavior? One key to understanding subliminal perception seems to lie in carefully defining what we mean by "subthreshold." For example, participants in a study by Niedenthal (1990) were asked to view a series of cartoon characters. Before each cartoon slide, a face expressing either joy or disgust was presented for 2 milliseconds—too briefly for the participants to be consciously aware of its presence. Later, participants viewed a second set of cartoons, some they'd seen previously (*targets*) and new ones they had not seen (*distractors*). As before, a face was briefly presented before each cartoon—but for half of the target slides, a change was made. Target cartoons that had initially been paired with a smiling face were now paired with a frowning face, and vice versa. Niedenthal reasoned that if the joy or disgust presented had influenced subjects' initial perception of the target cartoons, then a consistent emotion should facilitate their ability to recognize the cartoons later on. As predicted, participants recognized the target cartoons faster when the emotion expressed (joy or disgust) was consistent with the emotion expressed during the initial trials. Thus, the stimuli in Niedenthal's study were below threshold in terms of conscious awareness—but not in terms of participants' ability to respond to them.

Another critical issue to consider is the way in which subthreshold stimuli are evaluated. In chapter 1 we discussed the importance of controlled experimentation to rule out possible alternative explanations for certain findings. For example, consider the current explosion of self-help materials that offer to help you lose weight, stop smoking, get smarter, or improve your memory. Their manufacturers often claim that the effectiveness of these products is due to the presence of subliminal messages. Are these claims true? The results of careful research suggest that the answer is no (Greenwald et al., 1991; Urban, 1992). Instead, improvements appear to stem from other factors, such as motivation and expectations—not from the effects of subliminal perception. So rest easy; there's little danger that we will soon be coaxed down a path of loose morality by satanic moguls in the recording industry, or that advertisers will send us marching to the nearest store in robotlike fashion to purchase products they wish to promote.

SENSORY ADAPTATION: "It Feels Great Once You Get Used to It!"

Sensory Adaptation: *Reduced sensitivity to unchanging stimuli over time.*

I have vivid memories of summer camping trips I took as a young boy with my friends. On particularly hot afternoons we would cool off with a dip into an icy mountain lake or stream. Although the initial shock of the icy water

was overpowering, it eventually felt refreshing. This experience illustrates the process of **sensory adaptation**, the fact that our sensitivity to an unchanging stimulus tends to decrease over time. When we first encounter a stimulus, like icy water, our temperature receptors fire vigorously. Soon, however, they fire less vigorously, and through the process of sensory adaptation, the water then feels just right.

Sensory adaptation has some practical advantages. If it did not occur, we would constantly be distracted by the stream of sensations we experience each day. We would not adapt to our clothing rubbing our skin, to the feel of our tongue in our mouth, or to bodily processes such as eye blinks and swallowing. However, sensory adaptation is not always beneficial and can even be dangerous. For instance, after about a minute our sensitivity to most odors drops by nearly 70 percent. Thus, in situations where smoke or harmful chemicals are present, sensory adaptation may actually reduce our sensitivity to existing dangers. In general, though, the process of sensory adaptation allows us to focus on changes in the world around us, and that ability to focus on and respond to stimulus change is usually what is most important for survival.

Now that we've considered some basic aspects of sensation, let's examine in detail each of the major senses.

KEY POINTS

- Sensory receptors transduce physical energy into neural impulses, which are then interpreted by the central nervous system.
- The absolute threshold is the smallest magnitude of a stimulus that can be detected 50 percent of the time.
- Signal detection theory helps to separate sensitivity from motivational factors.
- Sensory adaptation allows us to focus on important changes in our environment.

VISION

Light, in the form of energy from the sun, is part of the fuel that drives the engine of life on earth. Thus, it is not surprising that we possess exquisitely adapted organs for detecting this stimulus: our eyes. Indeed, for most of us, sight is the most important way of gathering information about the world. Figure 3.2 (on page 96) shows a simplified diagram of the human eye.

THE EYE: Its Basic Structure

How is light energy converted into signals our brain can understand? The answer lies in the basic structure of the eye. It is in the eye that light energy is converted into a neural code understandable to our nervous system. Light rays first pass through a transparent protective structure called the **cornea** and then enter the eye through the **pupil**, a round opening whose size varies with lighting conditions: the less light present, the wider the pupil opening (refer to Figure 3.2). These adjustments are executed by the **iris**, the colored part of the eye, which is actually a circular muscle that contracts or expands to let in varying amounts of light. After entering through the pupil, light rays pass through the **lens**, a clear structure whose shape adjusts to permit us to focus on objects at varying distances. When we look at a distant object the muscles of the lens relax, allowing the lens to become thinner and flatter; when we look at a nearby object they contract, making the lens thicker and rounder. Light rays leaving the lens are projected on the **retina** at the back of the eyeball. As illustrated in Figure 3.3 (on page 96) the lens bends light rays in such a way that the image projected onto the retina is actually upside

Cornea: *The curved, transparent layer through which light rays enter the eye.*

Pupil: *An opening in the eye, just behind the cornea, through which light rays enter the eye.*

Iris: *The colored part of the eye that adjusts the amount of light that enters by constricting or dilating the pupil.*

Lens: *A curved structure behind the pupil that bends light rays, focusing them on the retina.*

Retina: *The surface at the back of the eye containing the rods and cones.*

Cones: *Sensory receptors in the eye that play a crucial role in sensations of color. (p. 96)*

Rods: *One of the two types of sensory receptors for vision found in the eye. (p. 96)*

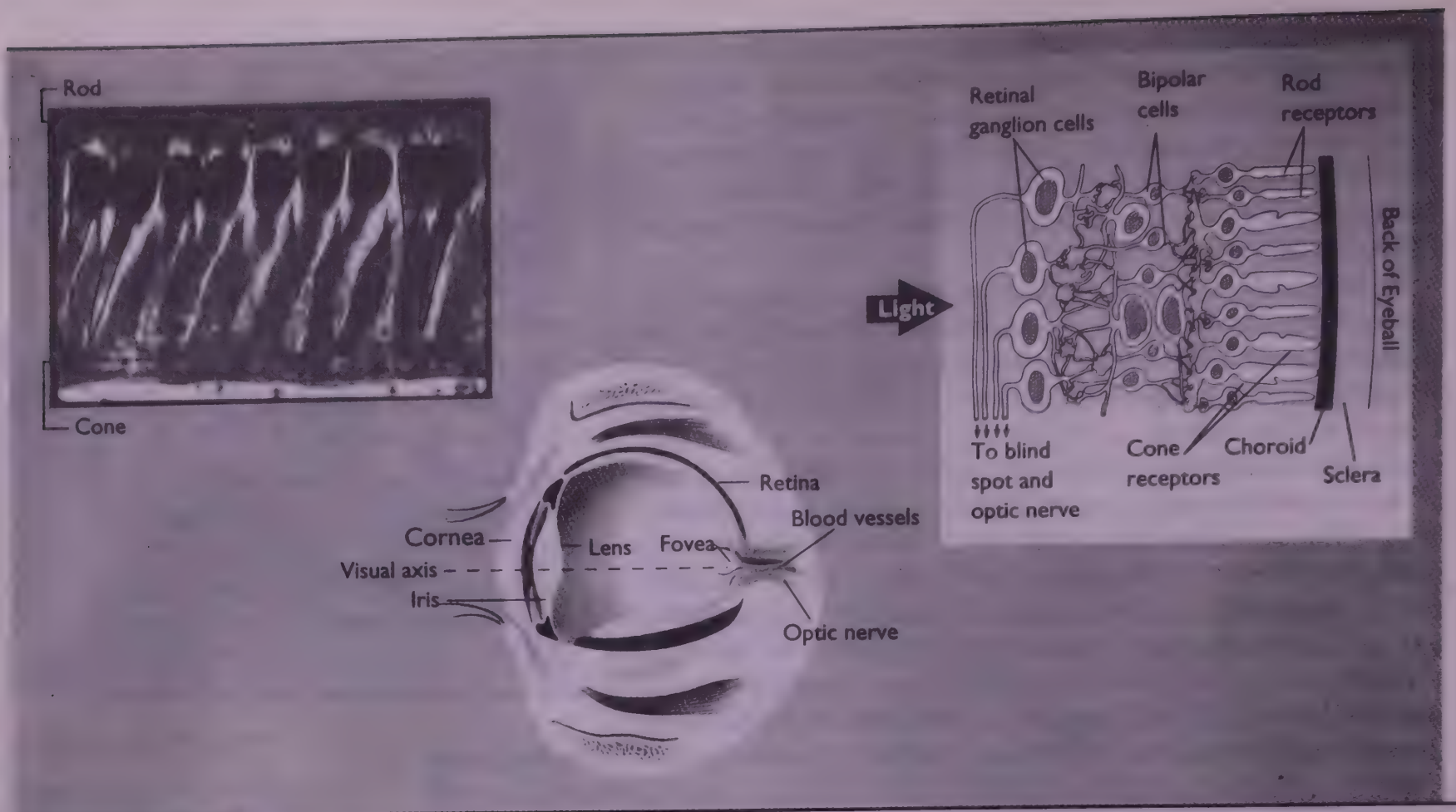


FIGURE 3.2

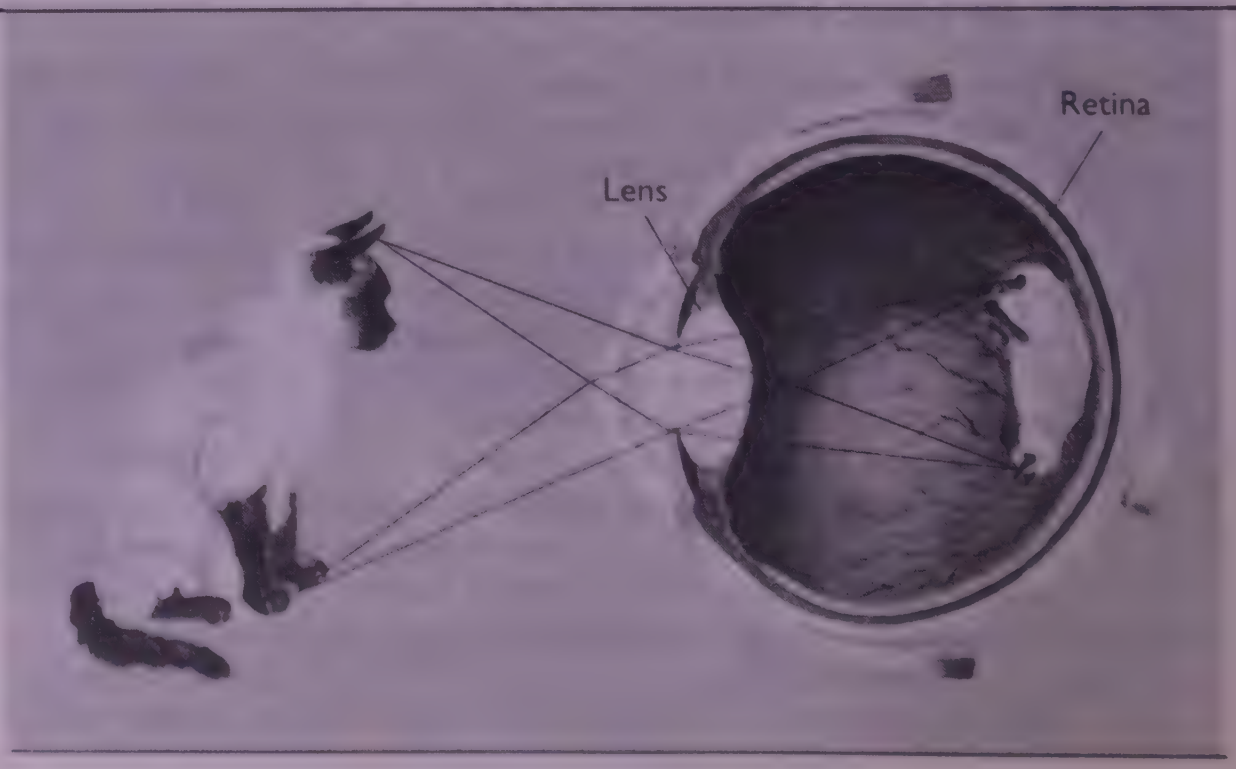
The Human Eye

Light filters through layers of retinal cells before hitting receptors (rods and cones), located at the back of the eye and pointed away from the incoming light. The rods and cones pass an electrical impulse to bipolar cells, which relay it to the ganglion cells. The axons of these cells form the fibers of the optic nerve.

down and reversed; but the brain reverses this image, letting us see objects and people correctly.

The retina is actually a postage-stamp-sized structure that contains two types of light-sensitive receptor cells: about 6.5 million **cones** and about 100 million **rods**. Cones, located primarily in the center of the retina in an area called the **fovea**, function best in bright light and play a key role both in color vision and in our ability to notice fine detail. In contrast, rods are found only outside the fovea and function best under lower levels of illumination, so rods help us to see in a darkened room or at night. At increasing distances from the

FIGURE 3.3



The Upside-Down and Reversed Image Projected onto the Retina

The lens bends light rays entering the eye so that the image projected onto the retina is upside down and reversed: Light rays from the top of an object are projected onto receptors at the bottom of the retina, and light rays from the left side of an object are projected onto receptors on the right side of the retina. Our brain rearranges this information and enables us to see the object correctly.

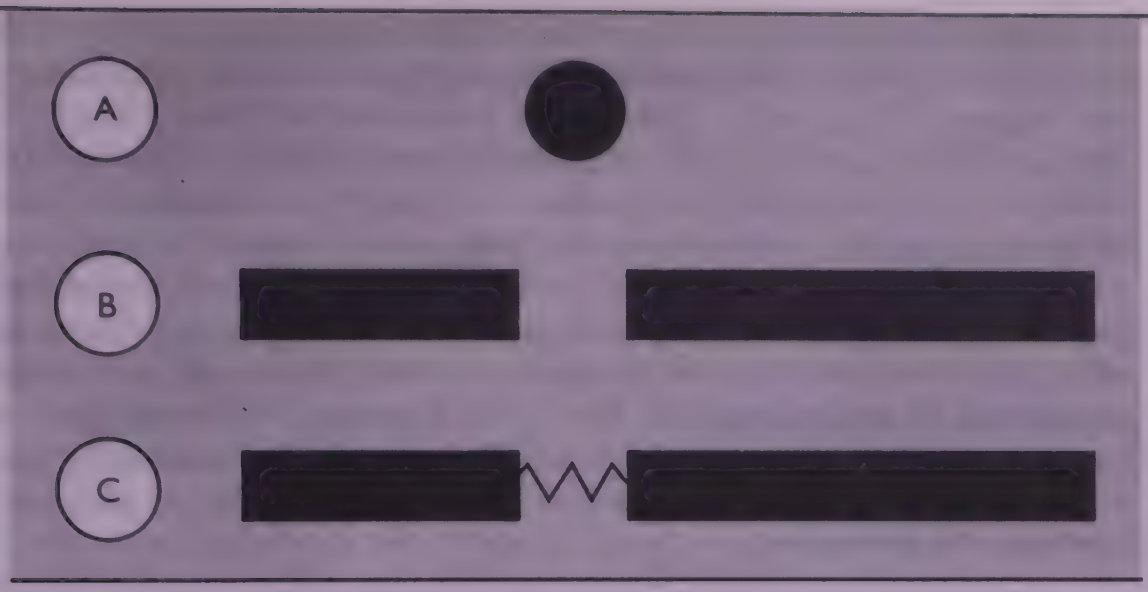


FIGURE 3.4

The Blind Spot

To find your blind spot, close your left eye and focus your right eye on the A. Slowly move the page toward and away from your right eye until the dot on the right disappears. The image of this dot is now being projected onto the blind spot—the region of the retina where there are no rods or cones. Now, follow the same procedure for the B and the C. What do you see?

fovea, the density of cones decreases and the density of rods increases. Once stimulated, the rods and cones transmit neural information to other neurons called *bipolar cells*. These cells, in turn, contact other neurons, called *ganglion cells*. Axons from the ganglion cells converge to form the **optic nerve** and carry visual information to the brain. Interestingly, no receptors are present where this nerve exits the eye, so there is a **blind spot** at this point in our visual field. Try the exercise in Figure 3.4 to check your own blind spot.

Fovea: *The area in the center of the retina in which cones are highly concentrated.*

Optic Nerve: *A bundle of nerve fibers that exit the back of the eye and carry visual information to the brain.*

Blind Spot: *The point in the back of the retina through which the optic nerve exits the eye. This exit point contains no rods or cones and is therefore insensitive to light.*

LIGHT: The Physical Stimulus for Vision

At this point we will consider some important facts about light, the physical stimulus for vision. First, the light that is visible to us is only a small portion of the electromagnetic spectrum. This spectrum ranges from radio waves at the slow or long-wave end to cosmic rays at the fast or short-wave end (see Figure 3.5).

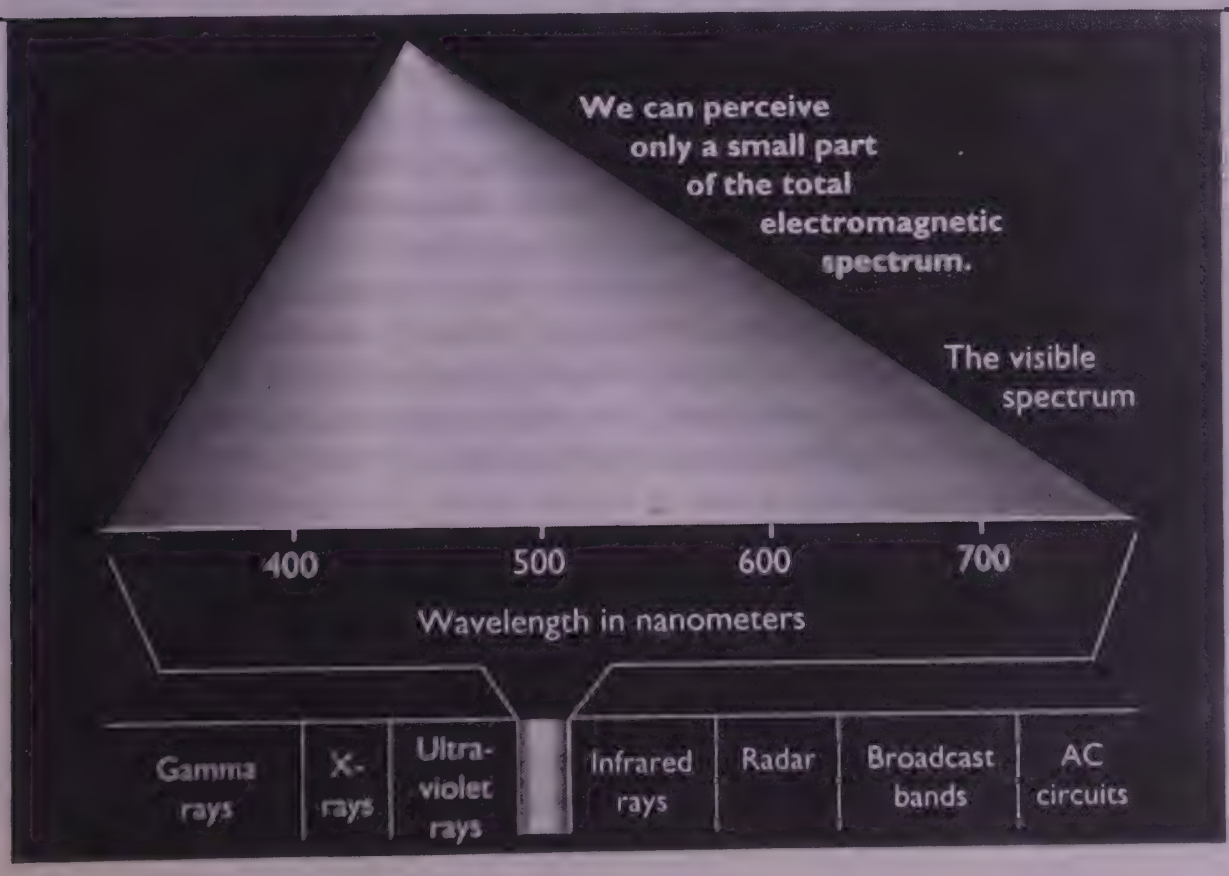


FIGURE 3.5

The Electromagnetic Spectrum

Visible light occupies only a narrow band in the entire spectrum.

Second, certain physical properties of light contribute to our psychological experiences of vision. **Wavelength**, the distance between successive peaks and valleys of light energy, determines what we experience as **hue**, or color. As shown in Figure 3.5, as wavelength increases from about 400 to 700 nanometers (a nanometer is one-billionth of a meter), our sensations shift from violet through blue (shorter wavelengths), green, yellow, orange (medium wavelengths), and finally red (longer wavelengths). The intensity of light, the amount of energy it contains, is experienced as **brightness**. The extent to which light contains only one wavelength, rather than many, determines our experience of **saturation**; the fewer the number of wavelengths mixed together, the more saturated or "pure" a color appears. For example, the deep red of an apple is highly saturated, whereas the pale pink of an apple blossom is low in saturation.

Basic Functions of the Visual System: Acuity, Dark Adaptation, and Eye Movements

Wavelength: *The peak-to-peak distance in a sound or light wave.*

Hue: *The color that we experience due to the dominant wavelength of a light.*

Brightness: *The physical intensity of light.*

Saturation: *The degree of concentration of the hue of light. We experience saturation as the purity of a color.*

Acuity: *The visual ability to see fine details.*

Nearsightedness: *A condition in which the visual image of a distant object is focused slightly in front of the retina rather than directly on it. Therefore distant objects appear fuzzy or blurred, whereas near objects can be seen clearly.*

Farsightedness: *A condition in which the visual image of a nearby object is focused behind rather than directly on the retina. Therefore close objects appear out of focus, while distant objects are seen clearly.*

Dark Adaptation: *The process through which the visual system increases its sensitivity to light under low levels of illumination.*

Our visual system is remarkably sensitive and can detect even tiny amounts of light. However, another important aspect of vision is **acuity**, the ability to resolve fine details. Two types of visual acuity are measured. The first is *static visual acuity (SVA)*, our ability to discriminate different objects when they are stationary or static, as on the familiar chart at an eye doctor's office. The second measure of acuity is *dynamic visual acuity (DVA)*, our ability to resolve detail when the test object and/or the viewer is in motion (Houfman, House, & Ryan, 1981). In general, our ability to discriminate objects decreases as the *angular velocity*—the speed at which an object's image moves across our retina—of the object increases. This aspect of our visual capacity is important in, for example, a professional baseball player's ability to detect a sizzling fastball out of the corner of his eye on his way to hitting a grand slam home run. If you wear eyeglasses or contact lenses designed to improve your visual acuity, chances are that your visual deficit stems from a slight abnormality in the shape of your eye. If your eyeball is too long, you suffer from **nearsightedness**, in which you see near objects clearly, but distant objects appear blurry. This occurs because the image entering your eye is focused slightly in front of the retina rather than directly on it. Similarly, in **farsightedness**, your eyeball is too short and the lens focuses the image behind the retina.

Another aspect of visual sensitivity is **dark adaptation**, the increase in sensitivity that occurs when we move from bright light to a dim environment, such as a movie theater. The dark-adapted eye is about 100,000 times more sensitive to light than the light-adapted eye. Actually, dark adaptation occurs in two steps. First, within five to ten minutes, the cones reach their maximum sensitivity. After about ten minutes, the rods begin to adapt; they complete this process in about thirty minutes (Matlin & Foley, 1992).

Eye movements also play a role in visual acuity. To appreciate the importance of the ability to move your eyes, just imagine how inefficient it would be to read a book or play your favorite sport if your eyes were stuck in one position. In order to change the direction of your gaze, you would have to move your entire head.

Eye movements are of two basic types: *version movements*, in which the eyes move together in the same direction, and *vergence movements*, in which the lines of sight for the two eyes converge or diverge. As we'll discover later

in this chapter, vergence movements are crucial to our ability to perceive distance and depth. Three types of version movements are *involuntary movements*, *saccadic movements*, and *pursuit movements*.

At the end of this sentence, stop reading and stare at the last word for several seconds. Did your eyes remain motionless or did they tend to move about? The eye movements you probably experienced were *involuntary*; they occurred without your conscious control. These movements assure that the stimuli reaching our rods and cones are constantly changing. Like other sensory receptors, those in our retina are subject to the effects of sensory adaptation; if involuntary movements did not occur, we would experience temporary blindness whenever we fixed our gaze on any object for more than a few seconds.

Saccadic movements are fast, frequent jumps by the eyes from one fixation point to the next. Saccadic movements are apparent in reading or driving. Careful research has shown that both the size of the jumps and the region seen during each fixation maximize the information we glean while reading (McConkie et al., 1989; McConkie & Zola, 1984; Just & Carpenter, 1987). Moreover, the saccadic movements of good readers move smoothly across the materials being read; those of poor readers are shorter and move backward as well as forward (Schiffman, 1990). Finally, *pursuit movements* are smooth eye movements used to track moving objects, as when you watch a plane fly overhead and out of sight.

Color Vision

A world without color would be sadly limited, for color—vivid reds, glowing yellows, restful greens—is a crucial part of our visual experience. For many people, though, some degree of color deficiency is a fact of life. Nearly 8 percent of males and 0.4 percent of females are less sensitive than the rest of us either to red and green or to yellow and blue (Nathans, 1989). And a few individuals are totally color blind, experiencing the world only in varying shades of white, black, and gray. Intriguing evidence on how the world appears to people suffering from color weakness has been gathered from rare cases in which individuals have normal color vision in one eye and impaired color vision in the other (e.g., Graham & Hsia, 1958). For example, one such woman indicated that to her color-impaired eye, all colors between red and green appeared yellow, while all colors between green and violet seemed blue. See Figure 3.6 to check your own color vision.

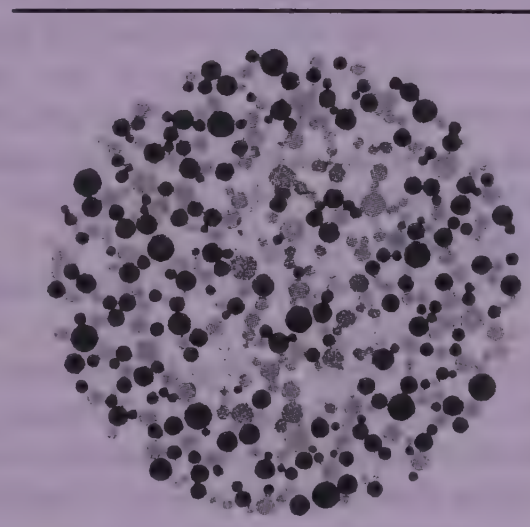


Figure 3.6

A Simple Test of Color Vision

What do you see in this circle? Persons who have normal color vision see the number 5; persons who have a color weakness may not.

There are two leading theories to explain our rich sense of color. The first, **trichromatic theory**, suggests that we have three different types of cones in our retina, each of which is maximally sensitive, though not exclusively so, to a particular range of light wavelengths—a range roughly corresponding to blue (450–500 nanometers), green (500–570 nanometers), or red (620–700 nanometers). Careful study of the human retina suggests that we do possess three types of color receptors, although as Figure 3.7 (on page 100) shows,

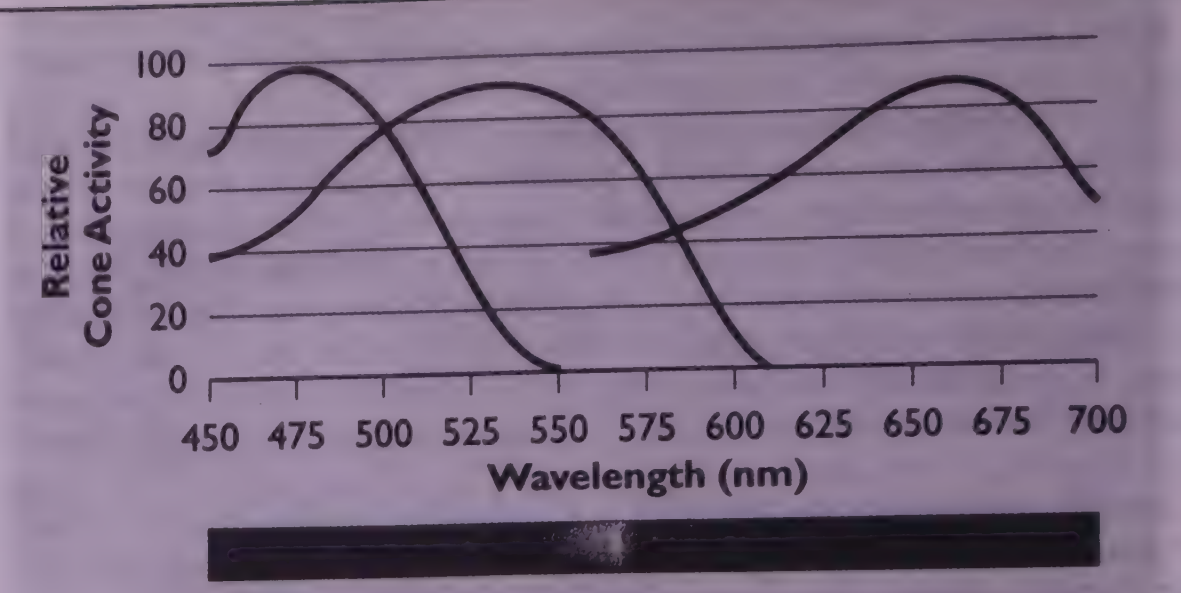
Saccadic Movements: *Quick movements of the eyes from one point of fixation to another.*

Trichromatic Theory: *A theory of color perception suggesting that we have three types of cones, each primarily receptive to particular wavelengths of light.*

FIGURE 3.7

Three Types of Receptors Contribute to Our Perception of Color

Color vision appears to be mediated by three types of cones, each maximally sensitive, but not exclusively so, to wavelengths corresponding to blue (450–500 nm), green (500–570 nm), and red (620–700 nm).



there is a great deal of overlap in each receptor type's sensitivity range (DeValois & DeValois, 1975; Rushton, 1975). According to trichromatic theory, our ability to perceive colors result from the joint action of the three receptor types. Thus, light of a particular wavelength produces differential stimulation of each receptor type, and it is the overall pattern of stimulation that produces our rich sense of color. This differential sensitivity may be due to genes that direct different cones to produce pigments sensitive to blue, green, or red (Nathans, Thomas, & Hogness, 1986).

Trichromatic theory, however, fails to account for certain aspects of color vision, such as the occurrence of **negative afterimages**—sensations of complementary colors that occur after one stares at a stimulus of a given color. For example, after you stare at a red object, if you shift your gaze to a neutral background, sensations of green may follow. Similarly, after you stare at a yellow stimulus, sensations of blue may occur. (Figure 3.8 demonstrates a negative afterimage.)

The **opponent-process theory** addresses phenomena such as afterimages more effectively than trichromatic theory, by accounting for what happens after the cones in the retina transmit their information to the bipolar and ganglion cells. Opponent-process theory suggests that we possess six kinds of cells that play a role in sensations of color (DeValois & DeValois, 1975). Two of these handle red and green: One is stimulated by red light and inhibited by green light, whereas the other is stimulated by green light and inhibited by red. This is where the phrase *opponent process* originates. Two additional types of cells handle yellow and blue: One is stimulated by yellow and inhibited by blue, while the other shows the opposite pattern. The remaining two types handle black and white—again, in an opponent-process manner. Opponent-process theory can help explain the occurrence of negative afterimages (Jameson & Hurvich, 1989). The idea is that when stimulation of one cell in an opponent pair is terminated, the other is automatically activated. Thus, if the original stimulus viewed was yellow, the afterimage seen would be blue. Each opponent pair is stimulated in different patterns by the three types of cones. It is the overall pattern of such stimulation that yields our complex and eloquent sensation of color.

Although these theories competed for many years, scientists now know that both are necessary to explain our impressive ability to respond to color. Trichromatic theory explains how color coding occurs in the cones of the retina, whereas opponent-process theory accounts for processing in higher-order nerve cells (Coren & Ward, 1989; Hurvich, 1981; Matlin & Foley, 1992).

Negative Afterimage: *A sensation of complementary color that we experience after staring at a stimulus of a given hue.*

Opponent-Process Theory: *A theory that describes the processing of sensory information related to color at levels above the retina. The theory suggests that we possess six types of neurons, each of which is either stimulated or inhibited by red, green, blue, yellow, black, or white.*

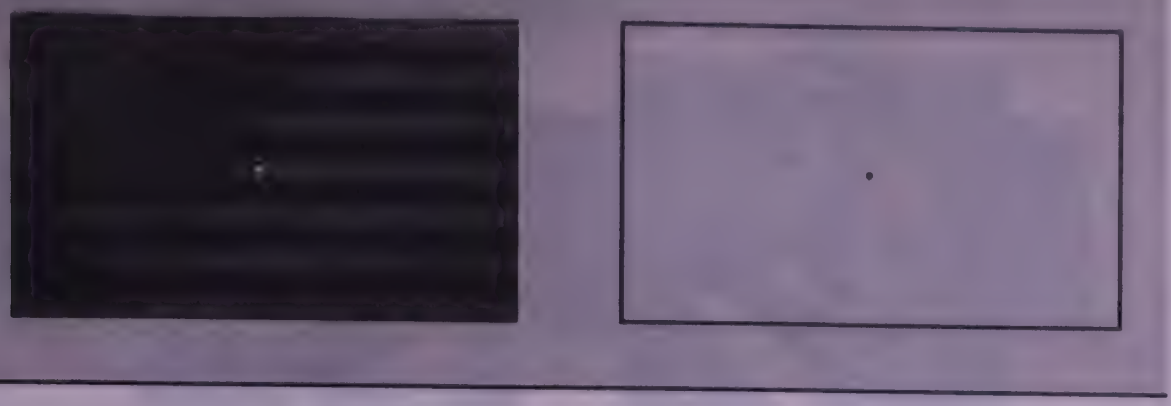


FIGURE 3.8

Demonstration of a Negative Afterimage

Stare at the object on the left for about one minute. Then shift your gaze to the blank space at the right. Do you see a negative afterimage?

VISION AND THE BRAIN: Processing Visual Information

Our rich sense of vision does not result from the output of single neurons, but instead from the overall pattern of our sensory receptors. In other words, there is more to vision than meets the eye. But how, then, do the simple action potentials of individual neurons contribute to our overall conscious experience? To help answer this question, let's consider how the brain "invents" our visual world.

Until recently scientists believed that visual scenes in our environment were impressed onto our retinas, much like images on photographic plates, and then sent directly to the brain. We now know this view is wrong, however. The visual world we perceive results from a complex division of labor that only *begins* in the retina. In other words, it is only light that enters our eyes—we really see with our brains.

The brain processes visual information hierarchically. Groups of neurons analyze simpler aspects of visual information and send their results to other groups of neurons for further analysis. At successive stages in this process, increasingly complex visual information is analyzed and compiled—eventually producing the coherent and flowing scenes that constitute perception of the world around us (Zeki, 1992).

Our understanding of the initial stages of this process was greatly advanced by the Nobel Prize–winning series of studies conducted by Hubel and Wiesel (1979). These researchers conducted studies on **feature detectors**—neurons at various levels in the visual cortex that respond primarily to stimuli possessing certain features. Their work revealed the existence of three types of feature detectors. One group of neurons, known as **simple cells,** responds to bars or lines presented in certain orientations (horizontal, vertical, and so on). A second group, **complex cells**, responds maximally to moving stimuli such as a vertical bar moving from left to right, or to a tilted bar moving from right to left. Finally, **hypercomplex cells** respond to even more complex features of the visual world, such as length, width, and even aspects of shape, like corners and angles. These cells may fail to respond to a thin bar moving from right to left, but may respond strongly to a thick bar moving from lower to higher regions of the visual field. Or they may respond to a shape containing a right angle but fail to respond to one containing an acute angle.

Additional clues suggesting that the brain processes visual information hierarchically come from case studies of persons with visual disorders like **prosopagnosia,** a condition in which people can no longer recognize faces, but still retain relatively normal vision in other respects (Goldberg, 1992). The existence of this kind of disorder suggests that the visual system operates

Feature Detectors: *Neurons at various levels within the visual cortex that respond primarily to stimuli possessing certain features.*

Simple Cells: *Cells within the visual system that respond to specific shapes presented in certain orientations (horizontal, vertical, etc.).*

Complex Cells: *Neurons in the visual cortex that respond to stimuli moving in a particular direction and having a particular orientation.*

Hypercomplex Cells: *Neurons in the visual cortex that respond to complex aspects of visual stimuli, such as width, length, and shape.*

Prosopagnosia: *A rare condition in which brain damage impairs a person's ability to recognize faces.*

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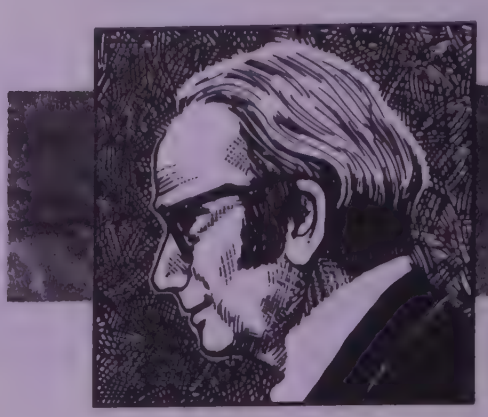
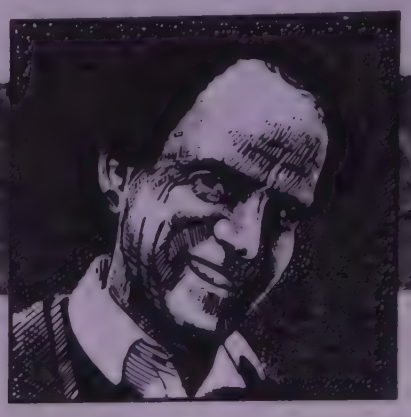


David Hunter Hubel

Hubel was corecipient of the 1981 Nobel Prize in Medicine for his work with Dr. Wiesel on visual information processing in the brain. He advises students of psychology to "train yourself thoroughly in biology, from molecular to ethology."



Torsten Nils Wiesel

Wiesel was corecipient of the 1981 Nobel Prize in Medicine for his work with Dr. Hubel on visual information processing in the brain. He urges students considering a career in psychology to "learn neurobiology as well."

Key People in Perception

much like a computer, assembling bits of visual information at various locations in the brain—and not like a camera. Prosopagnosia results from damage to specific areas within the visual cortex and surrounding areas. This "computer" model explains why we can lose certain visual abilities—like recognizing faces—while others, including the ability to perceive form, motion, or color remain largely unaffected (Mestre et al., 1992; Zeki, 1992). Using modern imaging techniques, scientists are beginning to unravel how we "see" the world around us. These tools create detailed visual images that help researchers pinpoint areas of the brain that, when damaged, result in predictable visual abnormalities.

Taken together, these findings have important implications for our understanding of visual perception. First, they suggest that the visual system is quite *selective*; certain types of visual stimuli stand a greater chance of reaching the brain and undergoing further processing. Second, since nature is rarely wasteful, the existence of cells specially equipped to detect certain features of the external world suggests that these features may be the building blocks for many complex visual abilities, including reading and identifying subtly varied visual patterns such as faces. Finally, as illustrated by

Key Points

- The physical stimulus for vision consists of electromagnetic waves that stimulate the rods and cones in the retina.
- Two theories that explain how we perceive color are trichromatic theory and opponent-process theory.
- Visual perception is a hierarchical process. At successive stages, increasingly complex visual information is analyzed and compiled.
- The basic building blocks of visual perception begin with feature detectors and continue with integration of this information at higher levels in the brain.

disorders such as prosopagnosia, "seeing" the world is a complex process—one that requires precise integration across many levels of our visual system.

HEARING

The murmur of laughing voices, the roar of a jet plane, the rustling of leaves, and that quintessential sound of the late twentieth century—the "beep, beep" of a personal computer—clearly we live in a world full of sound. And, as with vision, human beings are well equipped to receive many sounds in their environment. A simplified diagram of the human ear is shown in Figure 3.9; refer to it as you proceed through the discussion below.

THE EAR: *Its Basic Structure*

Try asking a friend, "When did you get your pinna pierced?" The response will probably be a blank stare. **Pinna** is the technical term for the visible part of our hearing organ, the *ear*. However, this is only a small part of the entire ear. Inside the ear is an intricate system of membranes, small bones, and receptor cells that transform sound waves into neural information for the brain. The *eardrum*, a thin piece of tissue just inside the ear, moves ever so slightly in response to sound waves striking it. When it moves, the eardrum causes three tiny bones within the *middle ear* to vibrate. The third of these bones is attached to a second membrane, the *oval window*, which covers a fluid-filled, spiral-shaped structure known as the **cochlea**. Vibration of the oval window causes movements of the fluid in the cochlea. Finally, the movement of fluid bends tiny *hair cells*, the true sensory receptors of sound. The neural messages they create are then transmitted to the brain via the *auditory nerve*.

Pinna: *The external portion of the ear.*

Cochlea: *A portion of the inner ear containing the sensory receptors for sound.*

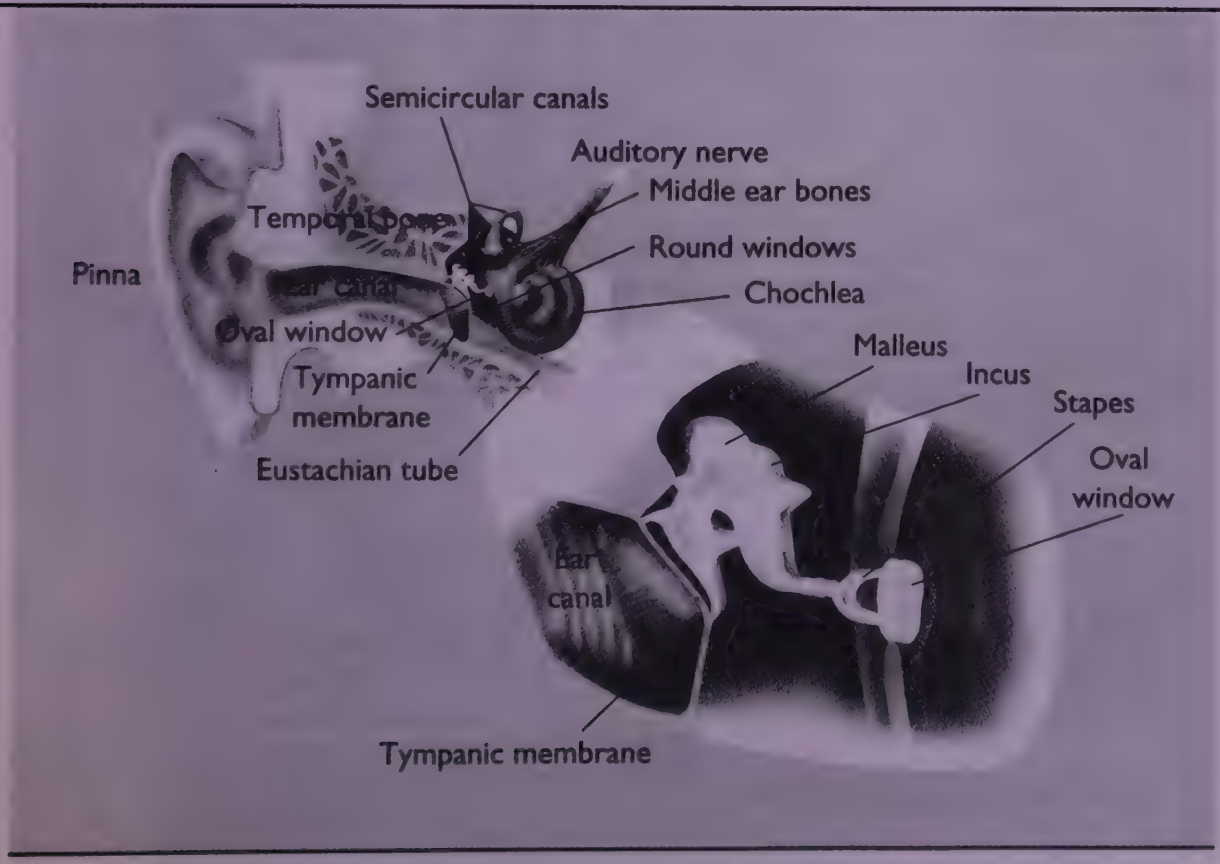


FIGURE 3.9

The Human Ear

A simplified diagram of the human ear. Sound waves (alternating compressions and expansions in the air) enter through the external auditory canal and produce slight movements in the eardrum. This motion, in turn, produces movements in fluid within the cochlea. As this fluid moves, tiny hair cells shift their position, thus generating the nerve impulses we perceive as sound.

Sound: The Physical Stimulus for Hearing

In discussing light, we noted that relationships exist between certain of its physical properties, such as wavelength and intensity, and psychological aspects of vision, like hue and brightness. Similar relationships exist for sound, at least with respect to two of its psychological qualities: *loudness* and *pitch*.

Sound waves consist of alternating compressions of the air, or, more precisely, of the molecules that compose air. The greater the *amplitude* (magnitude) of these waves, the greater their loudness to us; see Figure 3.10. The rate at which air is expanded and contracted constitutes the *frequency* of a sound wave, and the greater the frequency, the higher the **pitch**. Frequency is measured in cycles per second, or hertz (Hz), and humans can generally hear sounds ranging from about 20 Hz to about 20,000 Hz. In **Making Psychology Part of Your Life**, at the end of this chapter, we'll explore how the loudness of your stereo headset can dramatically affect your ability to hear certain sound frequencies.

Pitch: The characteristic of a sound that is described as high or low. Pitch is mediated by the frequency of a sound.

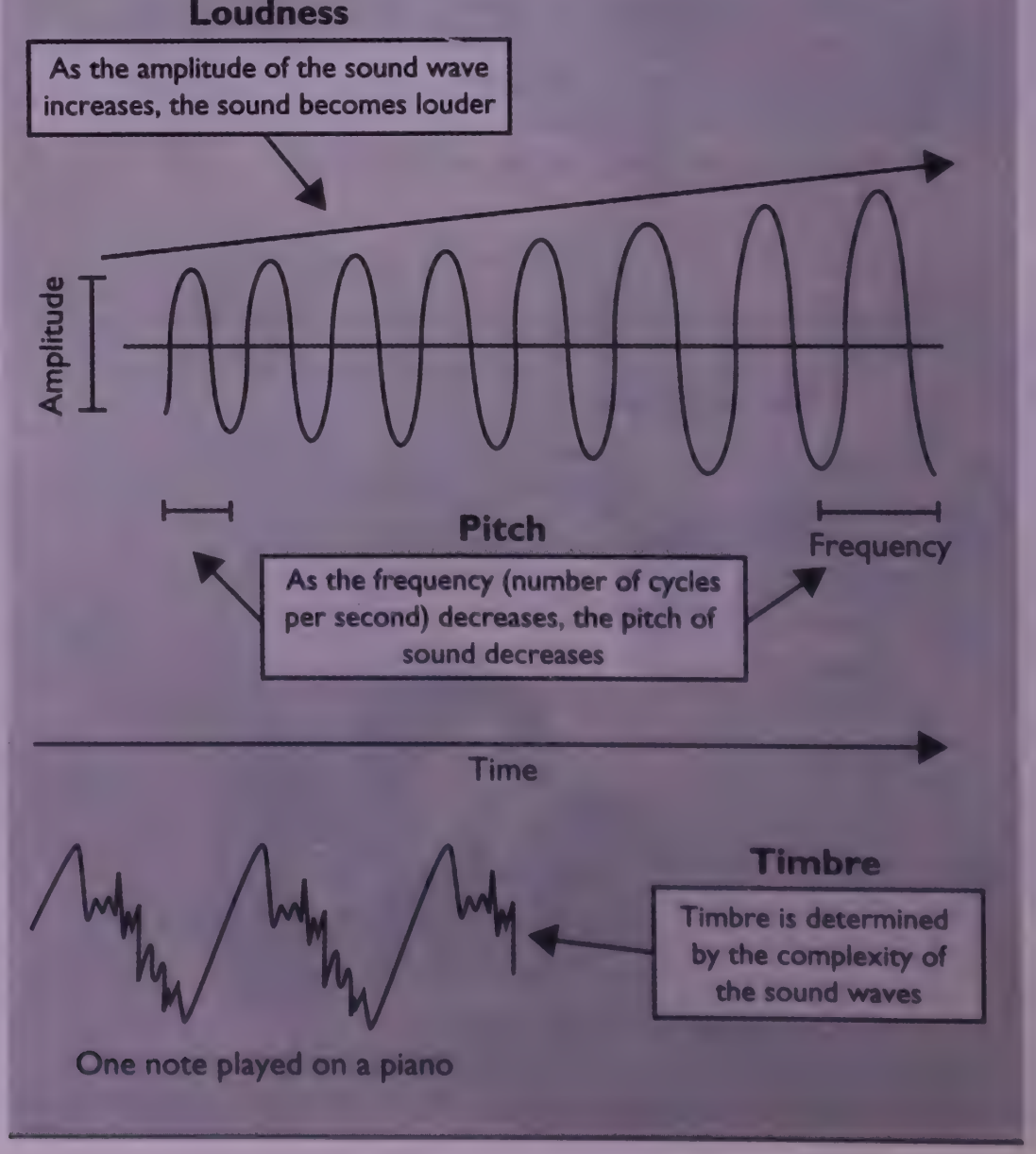
Timbre: The quality of a sound, resulting from the complex makeup of a sound wave; timbre helps us to distinguish the sound of a trumpet from that of a saxophone.

A third psychological aspect of sound—its **timbre**—refers to a sound's quality. This quality depends on the mixture of frequencies and amplitudes that make up the sound. For example, a piece of chalk squeaking across a blackboard may have the same pitch and amplitude as a note played on a

Figure 3.10

Physical Characteristics of Sound

Our perception of sounds is determined by three characteristics. *Loudness* depends on the amplitude or the height of the sound waves; as amplitude increases, the sound appears louder. *Pitch* is determined by the frequency of the sound waves; the number of sound waves that pass a given point per second. *Timbre* refers to the quality of the sound we perceive and is the characteristic that helps us distinguish the sound of a flute from the sound of a saxophone.



clarinet, but it will certainly have a different quality. In general, the timbre of a sound is related to its complexity—how many different frequencies it contains. However, other physical aspects of the source of the sound may be involved as well, so the relationship is not a simple one (refer to Figure 3.10).

SOUND WAVES: THE PHYSICAL STIMULUS FOR HEARING

Like light, sound has a range of intensities—from very soft to very loud.

PITCH PERCEPTION

When we tune a guitar or sing in harmony with other people, we demonstrate our ability to detect differences in pitch. Most individuals can easily tell when two sounds have the same pitch and when they are different. But how does a person manage to make such fine distinctions? Two explanations, based on two different mechanisms, seem to provide the answer.

Place theory (also called the *traveling wave theory*) suggests that sounds of different frequencies cause different places along the *basilar membrane* (the floor of the cochlea) to vibrate. These vibrations, in turn, stimulate the hair cells—the sensory receptors for sound. Actual observations have shown that sound does produce pressure waves and that these waves peak, or produce maximal displacement, at various distances along the basilar membrane, depending on the frequency of the sound (Békésy, 1960). High-frequency sounds cause maximum displacement at the narrow end of the basilar membrane near the oval window, whereas lower frequencies cause maximal displacement toward the wider, farther end of the basilar membrane (see Figure 3.11). Unfortunately, place theory does not explain our ability to discriminate among very low-frequency sounds—sounds of only a few hundred cycles per second—since displacement on the basilar membrane is nearly identical for these sounds. Another problem is that place theory does not account for our ability to discriminate sounds whose frequencies differ by as little as 1 or 2 Hz; basilar membrane displacement for these sounds is nearly identical.

Frequency theory suggests that sounds of different pitch cause different rates of neural firing. Thus, high-pitched sounds produce high rates of activity in the auditory nerve, whereas low-pitched sounds produce lower rates. Frequency theory seems to be accurate up to sounds of about 1,000 Hz—the

Place Theory: *A theory suggesting that sounds of different frequency stimulate different areas of the basilar membrane.*

Frequency Theory: *A theory of pitch perception suggesting that sounds of different frequencies, heard as differences in pitch, induce different rates of neural activity in the hair cells of the inner ear.*

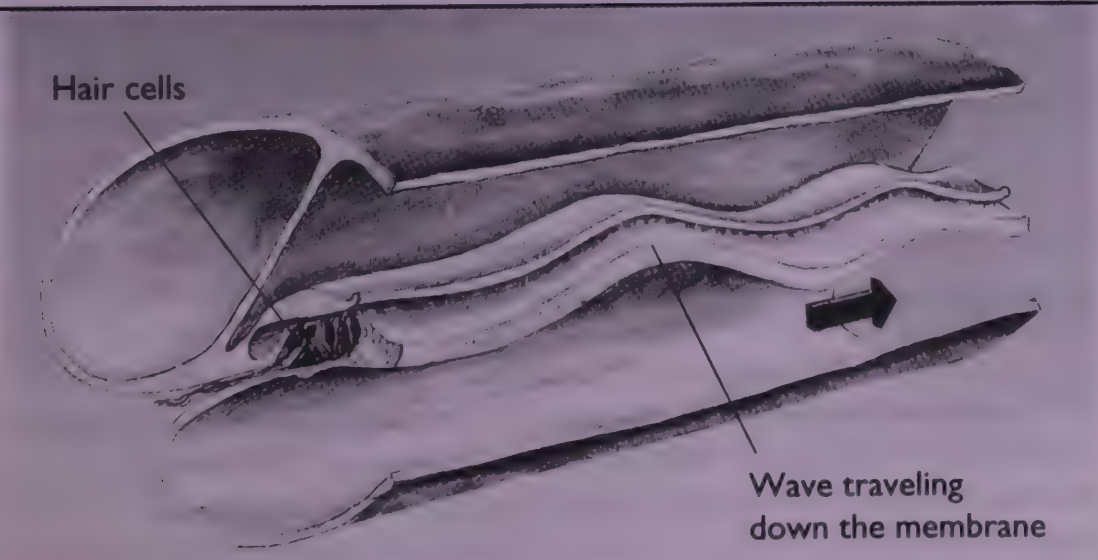


FIGURE 3.11

The Basilar Membrane

The cochlea is unwound and cut open to reveal the basilar membrane, which is covered with thousands of hair cells. Pressure waves in the fluid filling the cochlea cause oscillations to travel in waves down the basilar membrane, stimulating the hair cells.

maximum rate of firing for individual neurons. Above that level, the theory must be modified to include the *volley principle:* the assumption that sound receptors for other neurons begin to fire in volleys. For example, a sound with a frequency of 5,000 Hz might generate a pattern of activity in which each of five groups of neurons fires 1,000 times in rapid succession—that is, in volleys.

Since our daily activities regularly expose us to sounds of many frequencies, both theories are needed to explain our ability to respond to this wide range of stimuli. Frequency theory explains how low-frequency sounds are registered, whereas place theory explains how high-frequency sounds are registered. In the middle ranges, between 500 and 4,000 Hz, the range that we use for most daily activities, both theories apply.

Sound Localization

You are walking down a busy street filled with many sights and sounds. Suddenly a familiar voice calls your name. You instantly turn in the direction of this sound and spot one of your friends. How do you know where to turn? Research on **localization**—the ability of the auditory system to locate the source of a given sound—suggests that several factors play a role.

The first is the fact that we have two ears, placed on opposite sides of our head. As a result, our head creates a *sound shadow*, a barrier that reduces the intensity of sound on the "shadowed" side. Thus, a sound behind us and to our left will be slightly louder in our left ear. The shadow effect is strongest for high-frequency sounds, which have difficulty bending around the head, and may produce a difference in intensity of 30 decibels or more in the ear farthest away (Phillips & Brugge, 1985). The placement of our ears also produces a slight difference in the time it takes for a sound to reach each ear. Although this difference is truly minute—often less than one millisecond—it provides an important clue to sound localization.

What happens when sound comes from directly in front or directly in back of us? In this instance, we often have difficulty determining the location of the sound source, since the sound reaches our ears at the same time. Head movements can help resolve a problem like this. By turning your head, you create a slight difference in the time it takes for the sound to reach each of your ears—and now you can determine the location of the sound and take appropriate action (Moore, 1982).

In summary, our auditory system is ideally constructed to take full advantage of a variety of subtle cues. When you consider how rapidly we process and respond to such information, the whole system seems nothing short of marvelous in its efficiency.

Key Points

- Sound waves that stimulate tiny hair cells in the cochlea are the physical stimulus for hearing.
- Place theory and frequency theory help explain how we perceive pitch.
- The sound shadow created by our head helps us localize the source of sound.

Touch and Other Skin Senses

Localization: *The ability of our auditory system to determine the direction of a sound source.*

What is the largest sensory organ you possess? If you said anything except "my skin," think again. The skin is the largest sensory organ and produces the most varied experiences: everything from the pleasure of a soothing massage to the pain of injury. Actually, there are several skin senses, including touch (or pressure), warmth, cold, and pain.

Since there are specific sensory receptors for vision and hearing, it seems reasonable to expect this to be true for the various skin senses as well—one type of receptor for touch, another for warmth, and so on. And microscopic examination reveals several different receptor types, which led early researchers to suggest that each receptor type produced a specific sensory experience. Several researchers attempted to test this prediction. They located sensitive patches of their own skin, then snipped these patches out and examined them under a microscope. The results were disappointing; specific types of receptors were *not* found at spots highly sensitive to touch, warmth, or cold. Other studies have also shown that many different types of receptors often respond to a particular stimulus. Therefore, the skin's sensory experience is probably determined by the total pattern of nerve impulses reaching the brain.

The physical stimulus for sensations of touch is a stretching of or pressure against the receptors in or near the skin. But have you ever wondered why certain areas are more sensitive than others? As it turns out, the receptors in skin are not evenly distributed; the touch receptors in areas highly sensitive to touch, such as the face and fingertips, are much more densely packed than receptors in less sensitive areas, such as our legs (see Figure 3.12 on page 108). Additionally, areas of the skin with greater sensitivity also have greater representation in higher levels of the brain.

Most of us have experienced the soft texture of a baby's skin, the sleek feel of silk, or the grittiness of sandpaper. In most instances we discover the texture of an object through active exploration—using our fingertips or other sensitive areas of our body. Psychologists distinguish between *passive touch*, in which an object comes in contact with the skin, and *active touch*, in which we place our hand or other body part in contact with an object. We are considerably more accurate at identifying objects through active than through passive touch, in part because of feedback we receive from the movement of our fingers and hands when exploring an object (Matlin & Foley, 1992). Our understanding of active touch has been especially important in the development of reading aids for blind persons. For example, the **Braille alphabet** (a series of raised dots recognizable through touch) is much easier for blind persons to identify than raised versions of standard letters.

Pain: Its Nature and Control

Pain plays an important adaptive role; without it, we would be unaware that something is amiss with our body or that we have suffered some type of injury. Determining the mechanisms for pain sensation has been particularly difficult, because unlike the other sensory processes that we have studied, pain sensation has no specific stimulus (Besson & Chaouch, 1987). However, sensations of pain do seem to originate in *free nerve endings* located throughout the body: in the skin, around muscles, and in internal organs. Apparently, painful stimuli cause damage to body tissues. The tissues, in turn, release chemical substances, including a neurotransmitter called *substance P*, that stimulate specialized pain neurons; the messages from these neurons are responsible for our sensations of pain.

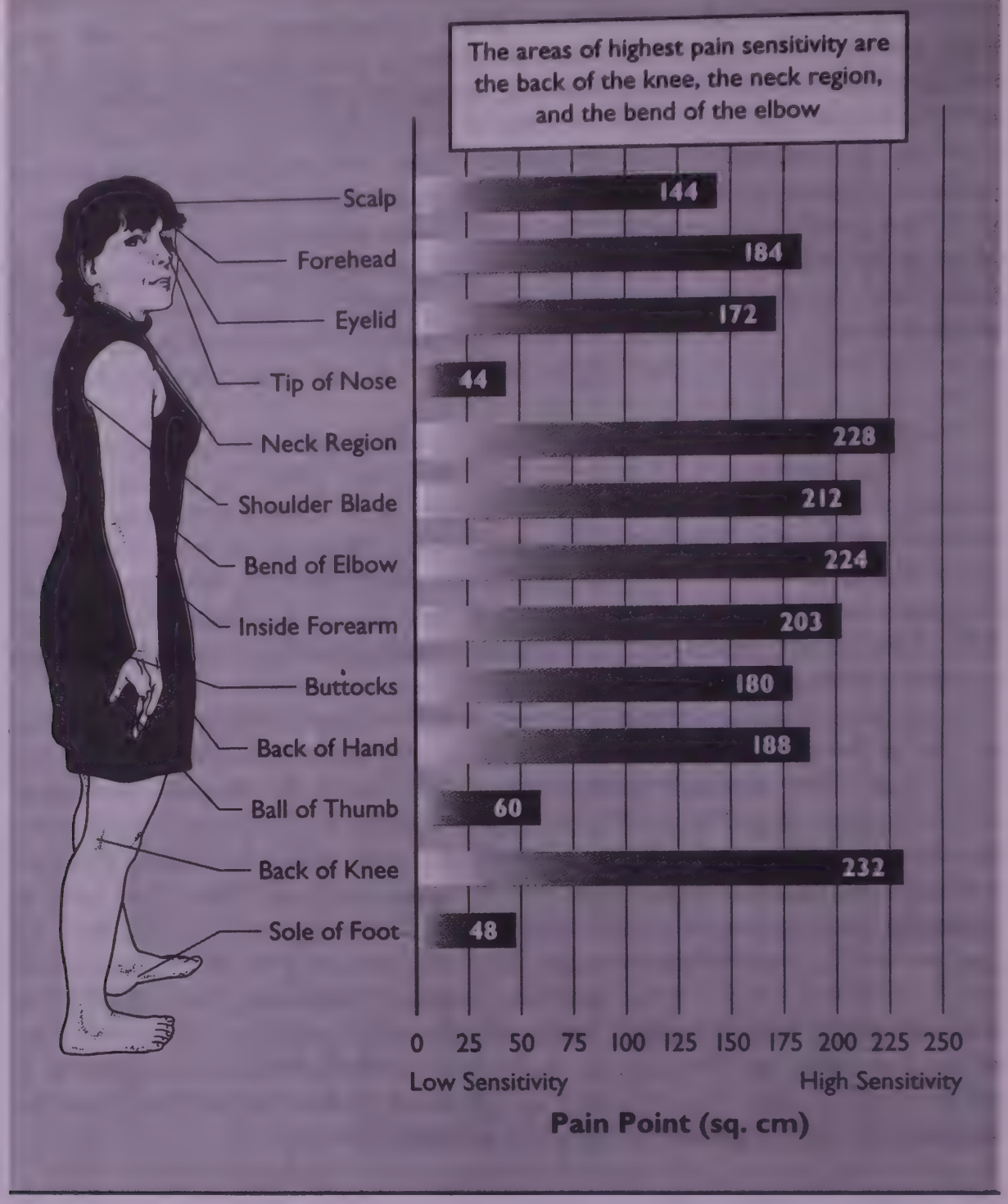
Actually, two types of pain seem to exist. One can best be described as quick and sharp—the kind of pain we experience when we receive a cut. The other is dull and throbbing—the pain we experience from a sore muscle or an injured back. The first type of pain seems to be transmitted through large myelinated sensory nerve fibers (Campbell & LaMotte, 1983). You may recall from chapter 2 that impulses travel faster along myelinated fibers, and so it makes sense that sharp sensations of pain are carried via these fiber types. In

Braille Alphabet: *Representation of letters by a system of raised dots, used in reading materials for blind persons.*

FIGURE 3.12

The Distribution of Pain Sensitivity over Various Regions of the Skin

Pain receptors are not distributed evenly on our skin.



contrast, dull pain is carried by smaller unmyelinated nerve fibers, which conduct neural impulses more slowly. Both fiber types synapse with neurons in the spinal cord that carry pain messages to the thalamus and other parts of the brain (Willis, 1985).

The discovery of the two pain systems described above led to the formulation of an influential view of pain known as the **gate-control theory** (Melzack, 1976). Gate-control theory suggests that there are neural mechanisms in the spinal cord that sometimes close, thus preventing pain messages from reaching the brain. Apparently, pain messages carried by the large fibers cause this "gate" to close, while messages carried by the smaller fibers—the ones related to dull, throbbing pain—cannot. This may explain why sharp pain is relatively brief, whereas an ache persists. The gate-control theory also helps to explain why vigorously stimulating one area to reduce pain in another sometimes works (Matlin & Foley, 1992). Presumably, tactics such as rubbing the skin near an injury, applying ice packs or hot-water bottles, and even acupuncture stimulate activity in the large nerve fibers, closing the spinal "gate" and reducing sensations of pain.

Gate-Control Theory: A theory suggesting that the spinal cord contains a mechanism that can block transmission of pain signals to the brain.

This theory has also been revised to account for the importance of several brain mechanisms in the perception of pain (Melzack & Wall, 1982). For example, our current emotional state may interact with the onset of a painful stimulus to alter the intensity of pain we experience. The brain, in other words, may affect pain perception by transmitting messages that either close the spinal "gate" or keep it open. The result: When we are anxious (as many persons are when sitting in a dentist's chair), pain is intensified; and when we are calm and relaxed, pain may be reduced. We'll explore the influence of other contextual factors—including culture—on the experience of pain in **Perspectives on Diversity** below.

Perspectives on Diversity

Culture and the Perception of Pain

Imagine the following scene: You are in the midst of an ancient tribal ceremony. Nearly a hundred warriors are seated cross-legged on the ground of a smoke-filled lodge. Their attention is riveted on two persons, an old man and a young one, standing face to face at the center of the room. Only a low, rhythmic drumbeat breaks the silence. Sunlight through the lodge's apex penetrates the smoke, revealing what comes next. Using an eagle's talon, the old man rips the skin above the younger man's chest, then inserts lengths of bone horizontally through each of the wounds. Amazingly, the young man's stoic expression remains unchanged. Loops of rope are then secured around the bones, and the young man is hoisted into the air, where he is allowed to dangle—until the bones tear through the skin or he becomes unconscious.

Sound like a sadistic late-night horror show? It's actually a description of *"swinging to the pole,"* a ceremony practiced by the Lakota Sioux and Cheyenne tribes in which warriors demonstrated their courage and ability to withstand tremendous pain. This ceremony and similar ones in other cultures have led to intriguing questions about the nature of pain (Weisenberg, 1982). Although we commonly view pain as something automatic and universal, large cultural differences exist in the interpretation and expression of pain, as illustrated in the "swinging" scene above. But what is the basis for these differences?

At first glance it is tempting to conclude that cultural differences in *pain threshold*—physical differences—are the cause. After all, many of us could never endure such torture. However, no consistent experimental evidence supports this view (Zatzick & Dimsdale, 1990). Instead, observed cultural differences in the capacity to withstand (or not withstand) pain seem to be perceptual in nature and to reflect the powerful effects of social learning (Morse & Morse, 1988). For example, honor and social standing among the Bariba of West Africa are tied closely to stoicism and the ability to withstand great pain (Sargent, 1984). Thus, both Bariba men and women are expected to suffer pain silently. And as you might expect, their language contains few words for the expression of pain. Additional environmental factors may also play a role in determining our perceptions of pain. For example, some evidence suggests that persons exposed to harsh living or working conditions become more stoical than those who work or live in more comfortable circumstances (Clark & Clark, 1980).

Taken together, the evidence suggests that pain may, in fact, be universal—at least in some respects. Specifically, differences in pain perception seem to result from the powerful effects of social learning, not from physical differences.

Culture and Pain

Pain is a universal sensation, but pain perception can be strongly influenced by one's culture.

Endorphins, the opiatelike chemicals our body produces, discussed in chapter 2, may also interact with the spinal "gate" to lessen sensations of pain (Akil et al., 1984; Millan, 1986). Researchers have found that certain areas of the spinal cord are highly enriched in opiate receptors and endorphin-containing neurons; thus, these substances may close the spinal gate by inhibiting the release of excitatory substances for neurons carrying information about pain (Snyder, 1977; Neale et al., 1978).

Drugs such as morphine can also be effective in relieving pain. Physicians often avoid prescribing these medications or administer them in levels too small to provide any benefit, because of the drugs' potentially addictive properties. However, under certain conditions and under close medical supervision, morphine can be used safely to relieve pain (Melzack, 1990). Apparently, context is the key: The chances of addiction are high when morphine is taken for "recreational" purposes, but low when it is taken for pain.

In cases of persistent excruciating pain, people sometimes seek relief through measures as extreme as surgery to sever nerve pathways. But because our perception of pain stems from both physical and psychological causes (Fernandez & Turk, 1992), psychologists have developed less drastic means of relief, collectively termed *cognitive-behavioral procedures*. Evidence suggests that changing our thoughts and feelings—as well as our overt responses—before, during, and after painful episodes can dramatically influence our perceptions of pain (Turk & Rudy, 1992). Although the specific mechanisms accounting for the success of cognitive-behavioral procedures remain unclear, an important element seems to be the extent to which we think negative thoughts while in pain. Some intriguing research has shown that reducing or interrupting such thoughts can greatly improve our ability to cope with pain (Chaves & Brown, 1987; Turner & Clancy, 1986). As a long-time runner, I have used these and related techniques to deal with the pain associated with certain types of training. For example, I'm careful *not* to focus on the discomfort I sometimes feel and to think, instead, about other things. Of course, I'm careful to avoid overdoing it: Pain can be a warning sign that we are pushing our bodies to—and beyond—their limit. Woe to the athlete, runner or otherwise, who totally ignores these warnings! Other techniques that involve cognitive mechanisms, such as hypnosis, distraction, and social modeling, have also been successfully applied to relieve pain (Bellisimo & Tunks, 1984; Craig & Prkachin, 1978).

KEY POINTS

- The physical stimulus for touch is a stretching of or pressure against receptors in the skin.
- Sensations of pain originate in free nerve endings throughout the body.
- Cultural differences in pain perception result from learning—not physical differences.

SMELL AND TASTE: The Chemical Senses

Although smell and taste are separate senses, we'll consider them together for two reasons. First, both respond to substances in solution—that is, substances that have been dissolved in a fluid or gas, usually water or air. Second, in everyday life, smell and taste are interrelated.

SMELL AND TASTE: How They Operate

Endorphins: Opiatelike substances produced by the body.

SMELL The stimulus for sensations of smell consists of molecules of various substances contained in the air. Such molecules enter the nasal passages,

where they dissolve in moist nasal tissues. This brings them in contact with receptor cells contained in the *olfactory epithelium* (see Figure 3.13). Human beings possess only about 10 million of these receptors. (Dogs, in contrast, possess more than 200 million receptors.) Nevertheless, our ability to detect smells is impressive. To appreciate this, consider a "scratch-and-sniff" smell survey in which six different odors were embedded separately onto panels measuring about 1.75 by 1.25 inches. Amazingly, less than 1 ounce of each odor was needed to place these smells onto 11 million copies of the survey (Gibbons, 1986; Gilbert & Wysocki, 1987).

Our olfactory senses are restricted, however, in terms of the range of stimuli to which they are sensitive, just as our visual system can detect only a small portion of the total electromagnetic spectrum. Our olfactory receptors can detect only substances with molecular weights—the sum of the atomic weights of all atoms in an odorous molecule—between 15 and 300 (Carlson, 1994). This explains why we can smell the alcohol contained in a mixed drink, with a molecular weight of 46, but cannot smell table sugar, with a molecular weight of 342.

Several theories have been proposed for how smell messages reach the brain. *Stereochemical theory* suggests that substances differ in smell because they have different molecular shapes (Amoore, 1970; 1982). Unfortunately, support for this theory has been mixed; nearly identical molecules can have extremely different fragrances, whereas substances with very different chemical structures can produce very similar odors (Engen, 1982; Wright, 1982). Other theories have focused on isolating "primary odors," similar to the basic hues in color vision. But these efforts have been unsuccessful, because there is often disagreement in people's perceptions of even the most basic smells.

TASTE The sensory receptors for taste are located inside small bumps on the tongue known as *papillae*. Within each papilla is a cluster of *taste buds* (see Figure 3.14 on page 112). Each taste bud contains several receptor cells.

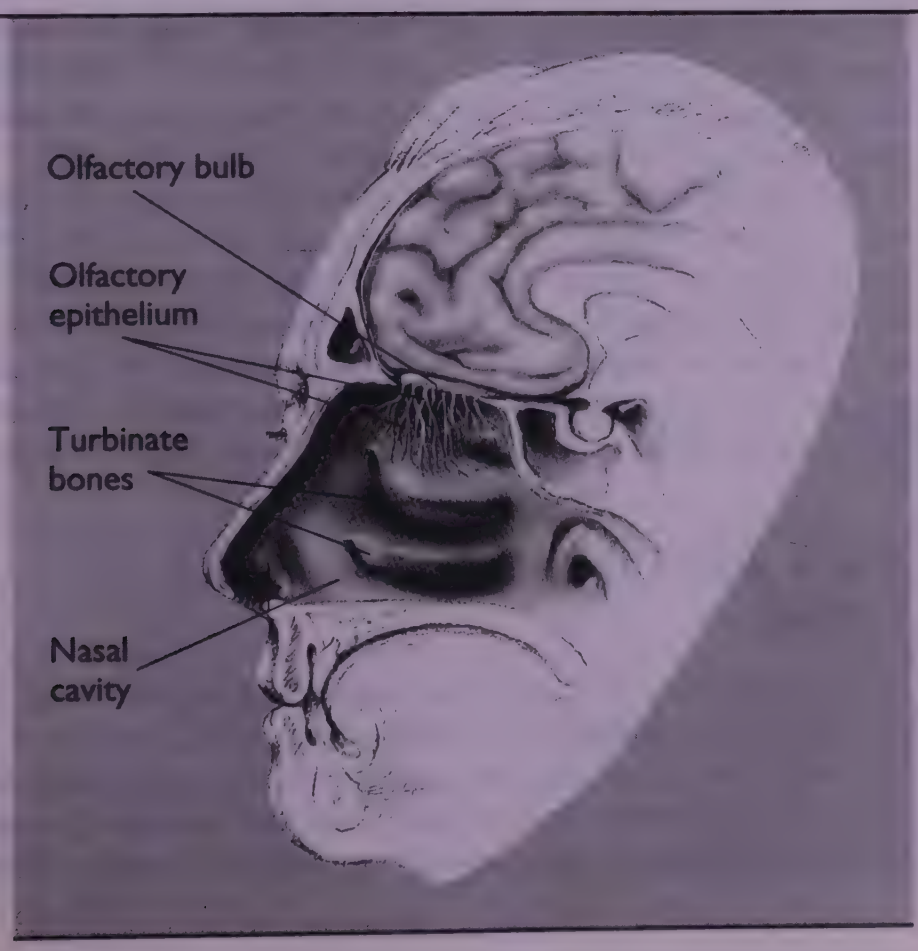


FIGURE 3.13

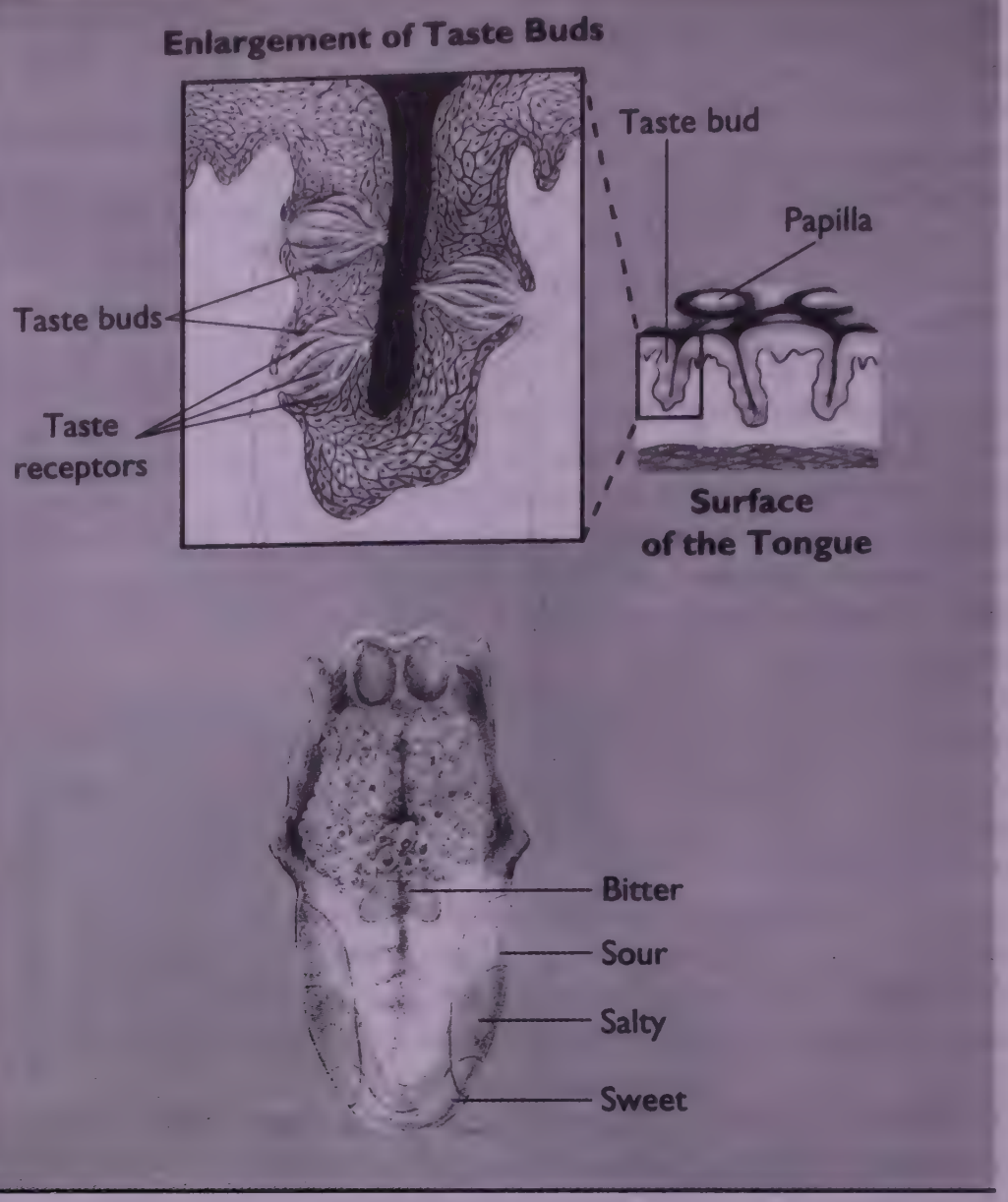
Location of Receptors for Smell

Receptors for our sense of smell are located in the olfactory epithelium, at the top of the nasal cavity. Molecules of odorous substances are dissolved in moisture present in the nasal passages. This brings them into contact with *receptor cells* whose neural activity gives rise to sensations of smell.

FIGURE 3.14

Sensory Receptors for Taste

Taste buds are located inside small bumps on the surface of the tongue known as papillae. Within each taste bud are individual receptor cells. Also shown here are the areas of the tongue most sensitive to the four basic tastes: sweet, salty, sour, and bitter.



Human beings possess about 10,000 taste buds. In contrast, chickens have only 24, while catfish would win any taste-bud–counting contest: They possess more than 175,000, scattered over the surface of their body. In a sense, they can "taste" with their entire skin (Pfaffmann, 1978).

People generally believe that they can distinguish a large number of flavors in foods. But in fact, there appear to be only four basic tastes: sweet, salty, sour, and bitter (see Figure 3.14). Why, then, do we perceive many more? The answer lies in the fact that we are aware not only of the taste of the food but of its smell, its texture, its temperature, the pressure it exerts on our tongue and mouth, and many other sensations. When these factors are removed from the picture, only the four basic tastes remain.

SMELL AND TASTE: Some Interesting Findings

Perhaps because they are more difficult to study, smell and taste have received far less attention from researchers than vision and hearing. However, this does not imply that these senses are not important. Indeed, individuals who have lost their sense of smell (a state known as *anosmia*) often become deeply depressed; some even commit suicide (Douek, 1988).

Despite the relative lack of research effort, many interesting facts have been uncovered about smell and taste. For example, it appears that we are not very good at identifying different odors (Engen, 1986). When asked to identify thirteen common fragrances (such as grape, smoke, mint, pine, and soap), individuals were successful only 32 percent of the time. Even when brand-name products or common odors are used, accuracy is still less than 50 percent. Some research suggests that we lack a well-developed representational system for describing olfactory experiences (Engen, 1987). In other words, we may recognize a smell without being able to name the odor in question—a condition sometimes called the "tip-of-the-nose" phenomenon (Lawless & Engen, 1977; Richardson & Zucco, 1989). And some experiments have shown that when odorants are associated with experimenter-provided verbal and visual cues, participants' long-term ability to recognize odors is enhanced (Lyman & McDaniel, 1986; 1987).

Actually, although our ability to identify specific odors is limited, our memory of them is impressive (Schab, 1991). Once exposed to a specific odor, we can recognize it months or even years later (Engen & Ross, 1973; Rabin & Cain, 1984). This may be due, in part, to the fact that our memory for odors is often coded as part of memories of a more complex and significant life event (Richardson & Zucco, 1989). For example, the delicious aroma of freshly made popcorn may elicit images of your favorite movie theater.

Knowledge about the chemical senses, especially smell, can also have important practical implications—a fact that has not escaped manufacturers of scented products. In the United States alone, sales of fragranced products exceed $19 billion annually (Foderaro, 1988). Commercial success has led to numerous claims regarding the potential benefits of fragrance. For example, practitioners of a field called *aromatherapy* claim that they can successfully treat a wide range of psychological problems and physical ailments by means of specific fragrances (Tisserand, 1977). Moreover, a growing number of companies have installed equipment that introduces various fragrances into the heating and air-conditioning systems of their buildings. Supposedly, the fragrances yield a variety of benefits: Fragrances such as lemon, peppermint, and basil lead to increased alertness and energy, whereas lavender and cedar promote relaxation and reduced tension after high-stress work periods (Iwahashi, 1992). Although little scientific evidence for such claims exists, the concept poses an intriguing question: Can fragrance influence human behavior in measurable ways? A growing body of evidence indicates the answer is yes. Several studies indicate that persons wearing perfume or cologne to job interviews can strongly affect the ratings they receive—but not always positively (Baron, 1983, 1986). Other evidence suggests that simply introducing pleasant fragrances into the air of work settings (known as *ambient fragrance*) can often produce beneficial effects (Baron & Thomley, 1994; Warm, Dember, & Parasuraman, 1991). In one study popular brands of air freshener were either sprayed or not sprayed into rooms where people worked on various tasks. Initial results showed that the presence of a pleasant aroma increased participants' confidence in their own ability to perform various tasks and raised the goals they set for themselves on these tasks. Additionally, the presence of pleasant scents enhanced participants' mood and so increased their willingness to compromise with opponents during negotiations. These results suggest that introducing pleasant scents into work settings may be one inexpensive and noncontroversial tactic for improving employees' performance and satisfaction.

KEY POINTS

- The physical stimulus for sensations of smell consists of molecules that stimulate receptor cells in the nose.
- The sensory receptors for taste are located in papillae on the tongue.
- Pleasant scents in the workplace can have beneficial effects on workers' attitudes and behaviors.

KINESTHESIA AND VESTIBULAR SENSE

THE VESTIBULAR SENSE

A spinning ice skater provides an example of rotational acceleration around one of the three axes monitored in the semicircular canals.

One night while driving, you notice flashing lights on the roadside ahead. Because traffic has slowed to a crawl, you get a close look at the situation as you pass by. A state trooper is in the process of administering a sobriety test to the driver of a car he has pulled over. The driver's head is tilted back at an angle, and he is trying to touch each of his fingers to his nose but is having great difficulty doing so. This example illustrates the importance of our *kinesthetic* and *vestibular senses*—two important but often ignored aspects of our sensory system.

Kinesthesia is the sense that gives us information about the location of our body parts with respect to each other and allows us to perform movements—from simple ones like touching our nose with our fingertips to more complex ones required for gymnastics, dancing, or driving an automobile. Kinesthetic information comes from receptors in joints, ligaments, and muscle fibers (Matlin & Foley, 1992). When we move our body, these receptors register the rate of change of movement speed as well as the rate of change of the angle of the bones in our limbs, then transform this mechanical information into neural signals for the brain. We also receive important kinesthetic information from our other senses, especially vision and touch. To demonstrate how your kinesthetic sense system draws on other senses, try the following experiment: Close your eyes for a moment and hold your arms down at your sides. Now without looking, touch your nose with each of your index fingers—one at a time. Can you do it? Most people can, but only after missing their nose a time or two. Now, try it again with your eyes open. Is it easier this way? In most instances it is, because of the added information we receive from our visual sense.

Whereas kinesthesia keeps our brain informed about the location of our body parts with respect to each other, the **vestibular sense** gives us information about body position, movement, and acceleration—factors critical for maintaining our sense of balance (Schiffman, 1990). We usually become aware of our vestibular sense after activities that make us feel dizzy, like amusement park rides that involve rapid acceleration or spinning motions.

The sensory organs for the vestibular sense are located in the inner ear (see Figure 3.15). Two fluid-filled **vestibular sacs** provide information about the body's position in relation to the earth by tracking changes in linear movement. When our body accelerates (or decelerates) along a straight line, as when we are in a bus that is starting and stopping, or when we tilt our head or body to one side, hair cells bend in proportion to the rate of change in our motion. This differential bending of hair cells causes attached nerve fibers to discharge neural signals that are sent to the brain.

Three fluid-filled **semicircular canals,** also in the inner ear, provide information about rotational acceleration of the head or body along three principal axes. Whenever we turn or rotate our head, the fluid in these canals begins to move and causes a bending of hair cells. Since these structures are arranged at right angles to each other, bending is greatest in the semicircular canal corresponding to the axis along which the rotation occurs.

Note that the vestibular system is designed to detect changes in motion rather than constant motion. For example, it helps us to detect the change in acceleration that accompanies takeoff in an airplane, but not the constant velocity that follows.

We also receive vestibular information from our other senses, especially vision—a fact that can produce queasy consequences if the information from

Kinesthesia: *The sense that gives us information about the location of our body parts with respect to each other and allows us to perform movements.*

Vestibular Sense: *Our sense of balance.*

Vestibular Sacs: *Fluid-filled sacs in our inner ear that provide information about the positions and changes in linear movement of our head and body.*

FIGURE 3.15

The Structures Underlying Our Sense of Balance

Shown here are the organs of our kinesthetic and vestibular senses. Structures in the two *vestibular sacs* provide information about the positions of the head and body with respect to gravity by tracking changes in linear movement, whereas those in the *semicircular canals* provide information about *rotational acceleration* around three principal axes.

these senses is in conflict (Jefferson, 1993). Developers of a realistic "Back to the Future" ride at Universal Studios in Florida discovered this fact when riders in their DeLorean simulator lost their cookies. Apparently, the visual effects were not synchronized with the movements the riders felt. Once reprogrammed, however, the simulator conveyed the developers' initial intent—the sensation of flying through space and time.

KEY POINTS

- Kinesthesia informs the brain about the location of body parts with respect to each other.
- The vestibular sense provides information about body position, movement, and acceleration.

PERCEPTION: Putting It All Together

Up to this point we have focused on the sensory processes that convert raw physical stimulation into usable neural codes. But you may be wondering how this array of neural action potentials contributes to the richness of conscious experience. Stop for a moment and look around you. Do you see a meaningless swirl of colors, brightnesses, and shapes? Probably not. Now turn on the radio and tune it to any station. Do you hear an incomprehensible babble of sounds? Certainly not (unless, of course, you've tuned to a foreign-language or heavy metal station). In both cases, you "see" and "hear" more than the raw sensations that stimulate the receptors in your eyes, ears, and other sense organs; you see recognizable objects and hear understandable words or music. In other words, transmission of sensory information from sensory receptors to the brain is only part of the picture. Equally important is the process of perception—the way in which we *select*, *organize*, and *interpret* sensory input to achieve a grasp of our surroundings. The remainder of this chapter concerns some basic principles that influence perception.

Semicircular Canals: *Fluid-filled structures that provide information about rotational acceleration of the head or body around three principal axes of rotation.*

Perception: The Focus of Our Attention

Based on the preceding discussion, you may realize that your attention, or mental focus, captures only a small portion of the visual and auditory stimuli available at a given moment, while ignoring other aspects. But what about information from our other senses? By shifting the focus of our attention, we may suddenly notice smells, tastes, and tactile sensations that were outside our awareness only moments ago. For example, if you're absorbed in a good book or watching a suspenseful movie, you may not notice the delightful aroma of a freshly baked pie—at least until the cook says, "Dessert is ready!"

One thing is certain: We cannot absorb all of the available sensory information in our environment. Thus, we *selectively attend* to certain aspects of our environment while relegating others to the background (Johnston & Dark, 1986). Selective attention has obvious advantages, since it allows us to maximize information gained from the object of our focus while reducing sensory interference from other, irrelevant sources (Matlin & Foley, 1992). Unfortunately, selective attention to one thing may mean neglecting another. For a firsthand understanding of the power of selective attention, watch someone who is completely absorbed in a suspenseful novel or a thrilling sports event. Studies have shown that people can focus so intently on one task that they fail to notice other events occurring simultaneously—even very salient ones (Becklen & Cerone, 1983; Cherry, 1953). We are, however, faced with many everyday situations in which we must cope with multiple conflicting inputs. Think back to the last time you were at a crowded party with many conversations going on at once. Were you able to shut out all voices except for that of the person you were talking to? Probably not. Our attention often shifts to other aspects of our environment, such as a juicy bit of conversation or a mention of our own name (Moray, 1959). This is often referred to as the *cocktail party phenomenon* and illustrates one way in which we deal with the demands of divided attention.

Although we control the focus of our attention, at least to some extent, certain characteristics of stimuli can cause our attention to shift suddenly. Features such as contrast, novelty, stimulus intensity, color, and sudden change tend to attract our attention. Indeed, advertisers have capitalized on attention-getting strategies for years. Additionally, if you recall the discussion of signal detection theory early in this chapter, it should not surprise you that the focus of our attention is dramatically affected by higher-level cognitive processes; in other words, motivation and expectancy factors have a lot to do with selective attention.

As it turns out, our attentional processes play a crucial survival role in aspects of our everyday lives by alerting us to immediate natural dangers in our environment—enabling us, for example, to leap back onto the curb when we glimpse a speeding car out of the corner of our eye. You can probably imagine hundreds of ways in which attentional processes help you to avoid peril. But what about hazards for which there are no sensory cues available? One of the most deadly examples of such a hazard is radioactivity. The radioactive particles emitted by certain materials are colorless and odorless and thus cannot be detected through our normal sensory receptors; even a limited exposure, however, can have deadly consequences. In the following **Research Process** section, we'll examine how aspects of people's attentional processes have figured prominently in the development of effective *warnings*—information displays that attempt to influence people's behavior through the information they present.

DANGER—Warnings Are Effective Only under Certain Conditions; Develop Them with CAUTION

You are undoubtedly familiar with warnings. They appear everywhere and on everything—including network television (Rainie et al.,1993). In response to public criticism over high levels of violence portrayed on TV, even in children's programs, network executives at ABC, CBS, NBC, and Fox recently adopted the following warning: *"Due to some violent content, parental discretion is advised."* The warning is to accompany particularly violent TV episodes, although specific rules governing its use have not yet been established.

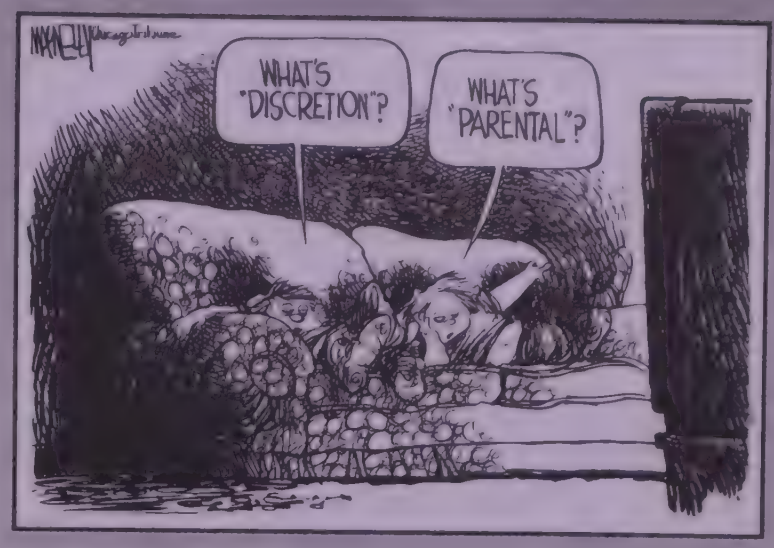
But is the use of this warning, and of the hundreds of others currently flooding our environment, justified? Even the experts cannot agree (McCarthy et al., 1984). Those opposed to the use of warnings argue that their excessive use may cause people to ignore warnings altogether. This point of view is consistent with what we know about our *information processing* limitations: As you may recall, we can only attend to and process a limited amount of sensory information before becoming overwhelmed. Also, using warnings for low-risk hazards or those with a low probability of occurring may teach people to ignore them, since these warnings are rarely associated with an aversive outcome such as death or serious injury.

These concerns, and others, have led to efforts to establish standards for development and use of warnings, including type size, font, color information, content and style, and placement (ANSI, 1988; FMC Corporation, 1985). But do warnings actually capture our attention? And more importantly, do they make a difference in getting us to act more safely?

RESEARCH ON WARNINGS

Warnings can be effective, but their ability to influence behavior is greatly affected by many factors—including the physical features of the warnings themselves and the way in which the warnings are presented (Wogalter & Young, 1993). In one study, Wogalter and Young (1991) examined the effects of warning modality (whether the warning was visual or auditory) on compliance behavior. Participants performed a chemistry demonstration task involving the measuring and mixing of what they thought were hazardous chemicals. Included in the instructions was the following message: *"WARNING: Wear gloves and mask while performing the task to avoid irritating fumes and possible irritation of skin."*

Participants received this warning in one of three ways: in printed form, orally (presented by the experimenter or by an audiotape), or both (printed instructions *and* oral presentation). Not surprisingly, compliance was highest when the warning was presented in both printed and oral form. Why? Since our conscious experience depends on input from *all* of our senses, presentation of critical information to multiple sensory modalities may enhance a warning's effectiveness. Additionally, auditory warnings may have added advantages, not yet considered. They can be lifesavers for blind people, and they can be heard in any direction.



TELEVISION WARNINGS: ARE THEY EFFECTIVE?

Warnings alone may be inadequate to counteract the potential effects of violence on TV.
(*Source*: Reprinted by permission: Tribune Media Services.)

But the use of warnings has not been universally successful, in part, because of a failure to recognize that effectiveness depends on our sensory *and* perceptual processes. To illustrate, let's consider the current alcohol beverage warning. Since October 1989 alcoholic beverage containers sold in the United States have been required to carry the following warning:

> *GOVERNMENT WARNING: (1) ACCORDING TO THE SURGEON GENERAL, WOMEN SHOULD NOT DRINK ALCOHOLIC BEVERAGES DURING PREGNANCY BECAUSE OF THE RISK OF BIRTH DEFECTS. (2) CONSUMPTION OF ALCOHOLIC BEVERAGES IMPAIRS YOUR ABILITY TO DRIVE A CAR OR OPERATE MACHINERY, AND MAY CAUSE HEALTH PROBLEMS.*

So what's the problem? The problem is that large-scale research has generally shown that the alcohol warning does not work—either in changing perceptions of risk or in changing behavior (Hilton, 1993). The reason? Developers of the warning apparently

failed to recognize the importance of both *sensation*—physical features of the warning—and *perception*—characteristics of persons exposed to the warning (Wogalter & Young, 1993). First, because of the small size of the current alcohol warning message, drinkers may be unable to read or even see it, especially as they become more intoxicated. Second, the warning is indistinguishable from other information on the label, such as the ingredients. Third, the warning lacks sufficient detail to convey the intended information effectively. Finally, the warning is found only on bottles and cans, which can be a definite problem when beer is served from kegs.

Equally important, though, is the failure of the current warning to consider important aspects of perception—how we organize and interpret the warning information. For example, the first part of the message focuses on the risks of drinking while pregnant. Although important, this information is not relevant to the experience and interests of high-risk groups other than pregnant women (for instance, college students).

Recent studies show that alcohol warnings can be effective when they are well designed and maximally relevant to specific target groups (Kalsher, Clarke & Wogalter, 1993). Moreover, the use of additional stimulus features, such as international symbols, illustrations that show a hazard to be avoided, and other "language-free" warning stimuli may also help solve problems of illiteracy and comprehension and help to eliminate language barriers (Friedmann, 1988; Otsubo, 1988). So the next time you encounter a warning—one that could possibly save your life—proceed with *caution*. (Please see chapter 17 for more information on the design of effective warnings.)

CRITICAL THINKING QUESTIONS

1. What are some of the implications of overusing warnings or using warnings for low-risk hazards?
2. Under what conditions would you recommend the use of warnings?
3. In light of the findings described in this special section, do you believe that warnings can be effective in increasing knowledge of alcohol-related hazards? Can they change behavior?
4. Suppose that you were called on to design a warning that would be effective in changing the behavior of your peers. What steps would you follow in its development and implementation?

PERCEPTION: Some Organizing Principles

Look at the illustrations in Figure 3.16. Instead of random smatterings of black and white, you can probably discern a familiar figure in each. But how does our brain allow us to interpret these confused specks as a dog and a horseback rider? The process by which we structure the input from our sensory receptors is called *perceptual organization*. Aspects of perceptual organization were first studied systematically in the early 1900s by **Gestalt psychologists**—German psychologists intrigued by certain innate tendencies of the human mind to impose order and structure on the physical world and to perceive sensory patterns as well-organized wholes rather than as separate, isolated parts (*Gestalt* means "whole" in German). These scientists outlined several principles that describe the way we organize basic sensory input into whole patterns (gestalts). Some of these are described below. You could say that the Gestalt psychologists changed our perceptions about the nature of perception.

Gestalt Psychologists: *German psychologists intrigued by our tendency to perceive sensory patterns as well-organized wholes rather than as separate, isolated parts.*

Figure-Ground Relationship: *Our tendency to divide the perceptual world into two distinct parts: discrete figures and the background against which they stand out.*

FIGURE AND GROUND: WHAT STANDS OUT? By looking carefully at Figure 3.17, you can experience a principle of perceptual organization known as the **figure-ground relationship**. What this means, simply, is that we tend to divide the world around us into two parts: *figure*, which has a definite shape and a location in space; and *ground*, which has no shape, seems to continue behind the figure, and has no definite location. The figure-ground relationship helps clarify the distinction between sensation and perception. While the

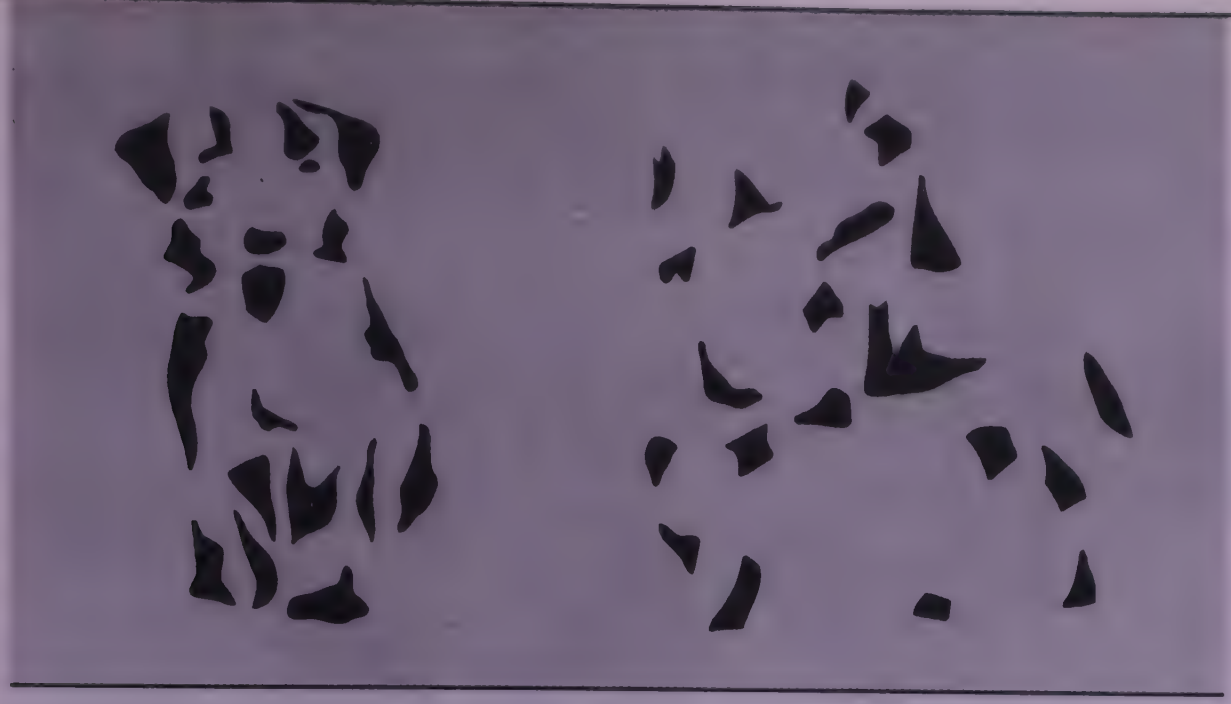


FIGURE 3.16

Perceptual Organization

Look carefully at each of these figures. What do you see? Our perceptual processes often allow us to perceive shapes and forms from incomplete and fragmented stimuli.

pattern of sensory receptors generated in our receptors remains constant, our perceptions shift between the two figure-ground patterns in Figure 3.17; thus, we may see either the young or the old woman, but not both. Note that the principles of perceptual organization apply to the other senses, too. For instance, consider how the figure-ground relationship applies to audition: During a complicated lecture, you become absorbed in whispered gossip between two students sitting next to you; the professor's voice becomes background noise. Suddenly you hear your name and realize the professor has asked you a question; her voice has now become the sole focus of your attention, while the conversation becomes background noise.

GROUPING: WHICH STIMULI GO TOGETHER? The Gestaltists also called attention to a number of principles known as the **laws of grouping**—basic ways in which we group items together perceptually. Several of these laws, including a more recently discovered perceptual grouping principle called *common region* (Palmer, 1992), are illustrated in the **Key Concept** feature on page 120. As you can see from this feature, laws of grouping do offer a good description of our perceptual tendencies.

The principles outlined by Gestalt psychologists are not, however, hard-and-fast rules. They are merely descriptions of ways in which we perceive the world around us. Whether these principles are innate, as the Gestaltists believed, or learned, as some newer evidence suggests, is still open to debate. In any case, principles of perceptual organization are readily visible in the natural world, and they are effective in helping us organize our perceptual world.

FIGURE 3.17

A Demonstration of Figure-Ground

What do you see when you look at this drawing? You probably see either an old woman or a young woman. Since this is an ambiguous figure, your perceptions may switch back and forth between these two possibilities.

Laws of Grouping: *Simple principles describing how we tend to group discrete stimuli together in the perceptual world.*

CONSTANCIES AND ILLUSIONS: When Perception Succeeds—and Fails

Perception, we have seen, is more than the sum of all the sensory input supplied by our eyes, ears, and other receptors. It is the active selection, organi-

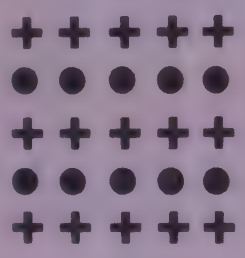
Key Concept

Gestalt Principles of Organization

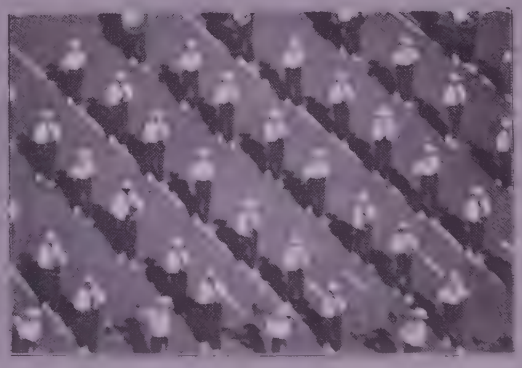
Figure-Ground
Tendency to view the world in two parts: *figure,* which has definite shape and location in space; and *ground,* background stimuli with no specific shape or location in space

Laws of Grouping

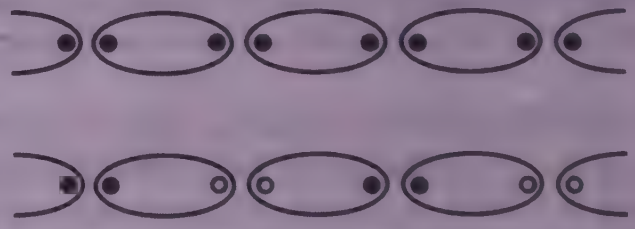
Law of Similarity
Tendency to perceive similar items as a group



Law of Proximity
Tendency to perceive items located together as a group



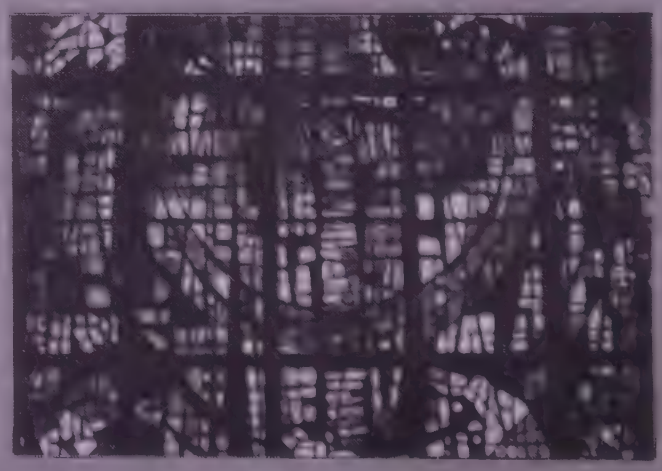
Law of Common Region
Tendency to perceive objects as a group if they occupy the same place within a plane



Law of Good Continuation
Tendency to perceive stimuli as part of a continuous pattern

Law of Closure
Tendency to perceive objects as whole entities, despite the fact that some parts may be missing or obstructed from view

Law of Simplicity
Tendency to perceive complex patterns in terms of simpler shapes



zation, and interpretation of such input. It yields final products that differ from raw, unprocessed sensations in important ways. Up to now, this discussion has focused on the benefits of this process. But perception, like any other powerful process, can be a double-edged sword. On the one hand, perception helps us adapt to a complex and ever-changing environment. On the other hand, perception sometimes leads us into error. To see how, let's consider *constancies* and *illusions*.

Perceptual Constancies: Stability in the Face of Change Try this simple demonstration. Hold your right hand in front of you at arm's length. Now, move it toward and away from your face several times. Does it seem to change in size? Probably not. Now hold your left hand in front of your face at a distance of about 20 cm (about 8 inches); again, move your right hand in and out. Does it seem to change in size now? Again, probably not. The purpose of this demonstration is to illustrate the principles of perceptual **constancies**—our tendency to perceive aspects of the world as unchanging despite changes in the sensory input we receive from them. The principle of **size constancy** relates to the fact that the perceived size of an object remains the same when the distance is varied, even though the size of the image it casts on the retina changes greatly. Under normal circumstances, such constancy is impressive. Consider, for example, seeing a friend you are meeting for lunch walking toward you, although still several blocks away. Distant objects—including cars, trees, and people—cast tiny images on your retina. Yet you perceive them as being of normal size. Two factors seem to account for this tendency: size-distance invariance and relative size.

The principle of *size-distance invariance* suggests that when estimating the size of an object, we take into account both the size of the image it casts on our retina and the apparent distance of the object. From these data we almost instantly calculate the object's size. Only when the cues that normally reveal an object's distance are missing do we run into difficulties in estimating the object's size (as we'll see in our discussion of illusions that follows). We also notice the **relative size** of an object compared to objects of known size. This mechanism is especially useful for estimating the size of unfamiliar things.

But size is not the only perceptual feature of the physical world that does not correspond directly with the information transmitted by our sensory receptors. The principle of **shape constancy** refers to the fact that the perceived shape of an object does not alter as the image it casts on the retina changes. For example, all of us know that coins are round; yet we rarely see them that way. Flip a coin into the air: although you continue to perceive the coin as being round, the image that actually falls onto your retina constantly shifts from a circle to various forms of an ellipse.

The principle of **brightness constancy** refers to the fact that we perceive objects as constant in brightness and color even when viewed under different lighting conditions. Thus, we will perceive a sweater as dark green whether indoors or outdoors in bright sunlight. Brightness constancy apparently prevails because objects and their surroundings are usually lighted by the same illumination source, so changes in lighting conditions occur simultaneously for both the object and its immediate surroundings. As long as the changes in lighting remain constant for both object and surround, the neural message reaching the brain is unchanged. Brightness constancy breaks down, however, when changes in lighting are not equivalent for both the object and its surroundings (Sekuler & Blake, 1990).

Although most research on perceptual constancies has focused on size, shape, and brightness, constancy pervades nearly every area of perception, including our other senses. For example, imagine listening to elevator music

Constancies: *Our tendency to perceive physical objects as unchanging despite shifts in the pattern of sensations these objects induce.*

Size Constancy: *The tendency to perceive a physical object as having a constant size even when the size of the image it casts on the retina changes.*

Relative Size: *A visual cue based on comparison of the size of an unknown object to one of known size.*

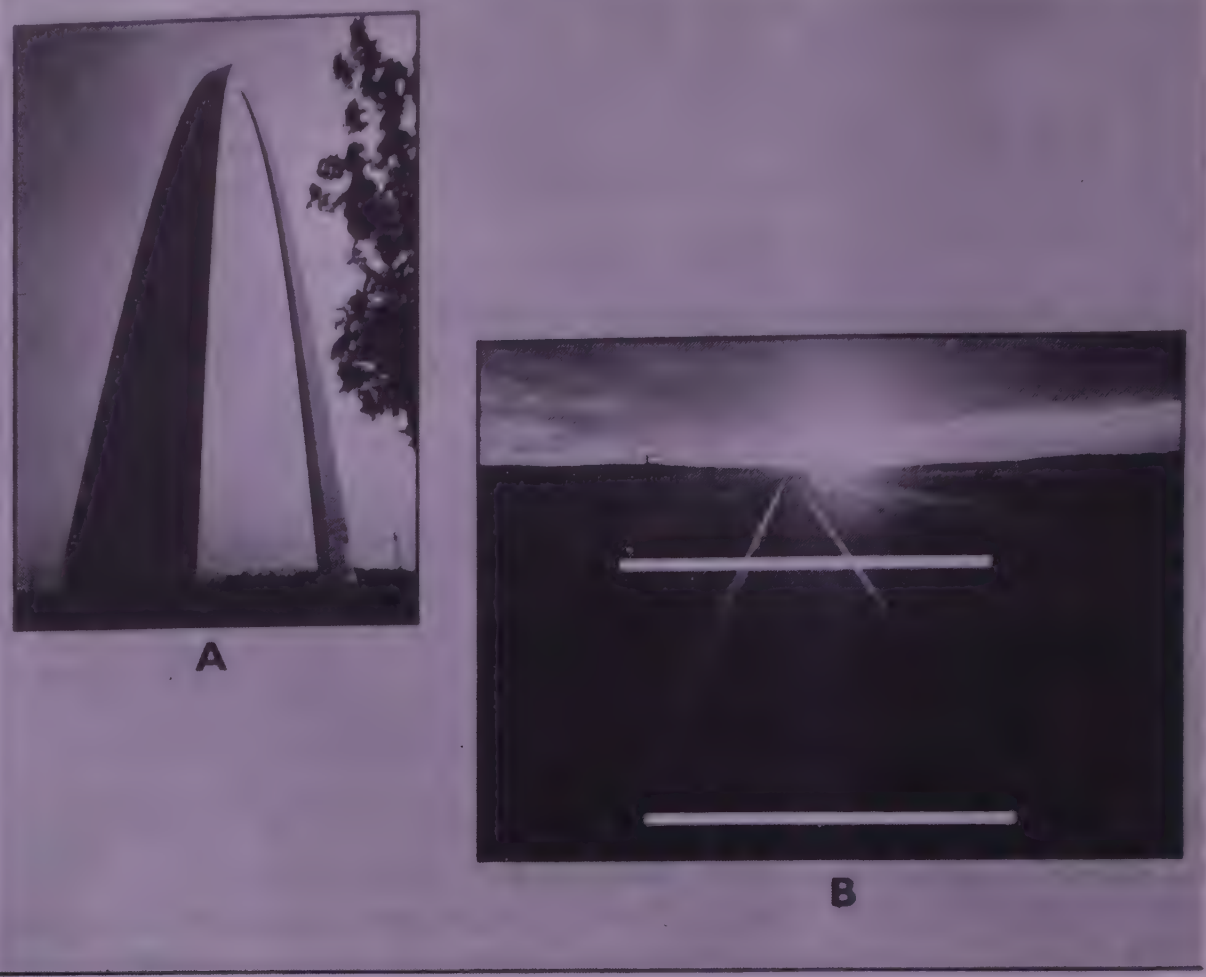
Shape Constancy: *The tendency to perceive a physical object as having a constant shape even when the image it casts on the retina changes.*

Brightness Constancy: *The tendency to perceive objects as having a constant brightness even when they are viewed under different conditions of illumination.*

FIGURE 3.18

Illusions of Size

Natural examples of two powerful illusions of size. (A) The horizontal-vertical illusion stems from our tendency to perceive objects higher in our visual field as more distant. This illusion helps explain why the St. Louis Gateway falsely appears taller than it is wide (its height and width are actually equal). (B) In the Ponzo illusion, the object in the distance appears larger, although both objects are actually the same size.



while riding on an elevator en route to a dental appointment on the thirtieth floor of an office building. When one of your favorite oldies from the mid-1970s begins, you can't believe what they've done to "your song." Nonetheless, you are still able to recognize it, despite differences in its loudness, tone, and pitch.

Whatever their basis, perceptual constancies are highly useful. Without them, we would spend a great deal of time and effort re-identifying sensory information in our environments each time we experienced the information from a new perspective. Thus, the gap between our sensations and the perceptions provided by the constancies is clearly beneficial.

ILLUSIONS: WHEN PERCEPTION FAILS Perception can also, however, provide false interpretations of sensory information. Such cases are known as **illusions**, a term used by psychologists to refer to incorrect perceptions. Actually, there are two types of illusions: those due to physical processes and those due to cognitive processes (Matlin & Foley, 1992). Illusions due to distortion of physical conditions include *mirages*, in which you perceive things that aren't really there—like the water you often seem to see on the dry road ahead of you. Our focus, however, will be on the latter type of illusions—those involving cognitive processes.

Illusions: *Instances in which perception yields false interpretations of physical reality.*

Countless illusions related to cognitive processes exist, but most fall into two categories: illusions of *size* and illusions of *shape* or *area* (Coren et al., 1976). Natural examples of two well-known size illusions are presented in Figure 3.18 and as you can see, their effects are powerful. But why do illusions occur? What causes our interpretation of such stimuli to be directly at odds with physical reality? Recent evidence suggests that illusions generally have multiple causes (Schiffman, 1990). However, one explanation is pro-

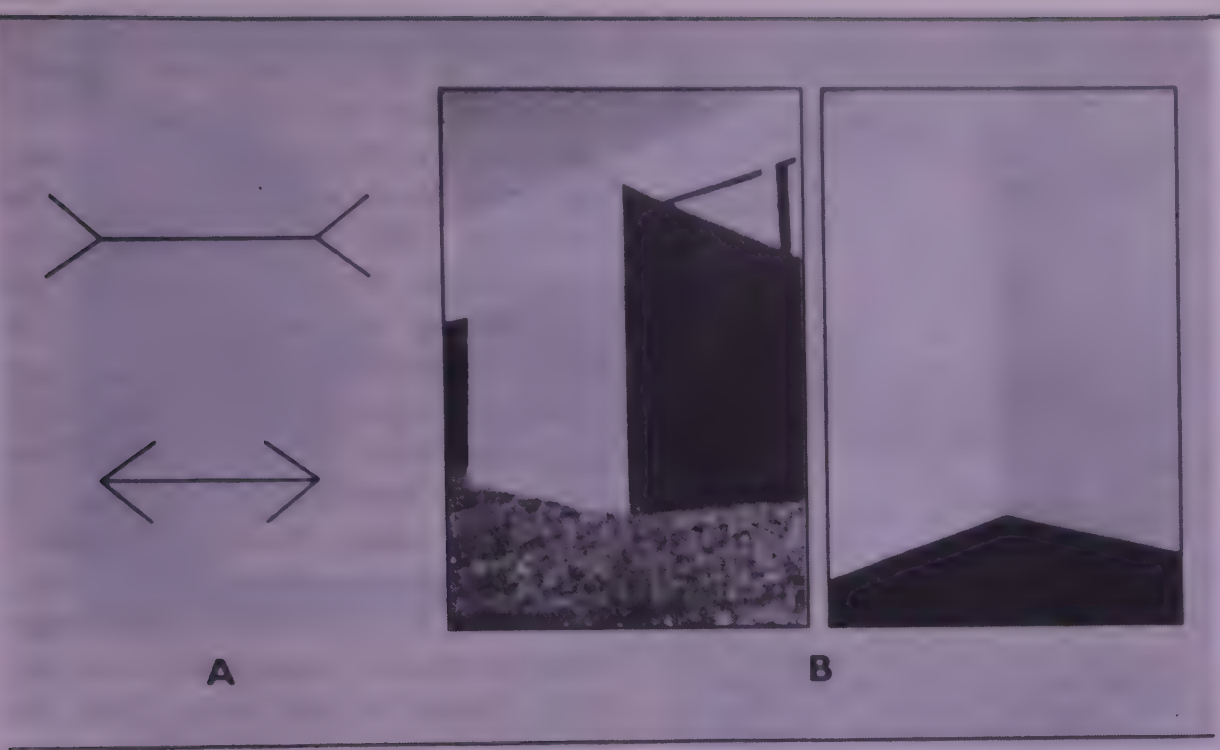


FIGURE 3.19

The Müller-Lyer Illusion

(A) In the Müller-Lyer illusion, lines of equal length appear unequal; the line with the wings pointing outward looks longer than the line with the wings pointing inward. (B) Now carefully examine the vertical line in each photograph. Which line is longer? Most people perceive the vertical line in the photo on the right as longer, although careful measurement shows they are exactly the same length!

vided by the *theory of misapplied constancy*. It suggests that when looking at illusions, we interpret certain cues as suggesting that some parts are farther away than others. Our powerful tendency toward size constancy then comes into play, with the result that we perceptually distort the length of various lines (refer to Figure 3.19). Learning also plays an important role in illusions, as shown in the architectural examples of the *Müller-Lyer illusion* in Figure 3.19. Past experience tells us that the corner shown in the photo on the right is usually farther away than the corner in the photo on the left. Since the size of the retinal image cast by the vertical lines in both photos is identical, we interpret the vertical line as longer in the photo on the right. Moreover, learning seems to affect the extent to which our perception is influenced by illusions, since many visual illusions decline in magnitude following extended exposure—although they do not decline altogether (Greist-Bousquet, Watson, & Schiffman, 1990).

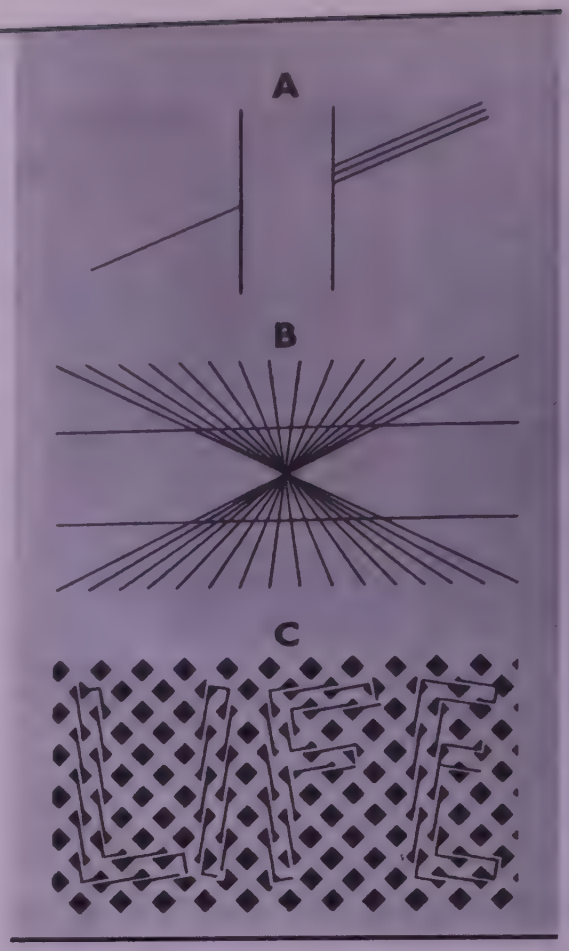
Another type of illusion is that of *shape* or *area*. If you've ever wondered why the moon looks bigger at the horizon (about 30 percent bigger!) than at its highest point in the sky, then you are familiar with the most famous area illusion—the *moon illusion*. Why does the moon illusion occur? In part, because when the moon is near the horizon, we can see that it is farther away than trees, houses, and other objects. When it is overhead at its zenith, such cues are lacking. Thus, the moon appears larger near the horizon because there are cues available that cause us to perceive that it is very far away. Once again, our tendency toward size constancy leads us astray.

Like illusions of size or area, shape illusions (see Figure 3.20 on page 124) can influence perception—sometimes producing some unsettling consequences. Consider a real-world example involving the *Poggendorf illusion* (see drawing A in Figure 3.20). In this illusion, a line disappears at an angle behind a solid figure, reappearing at the other side—at what seems to be the incorrect position. As reported by Coren and Girgus (1978), in 1965 two airplanes were about to arrive in New York City, and because of the Poggendorf illusion, they perceived that they were on a collision course. Both pilots changed their path to correct for what they perceived as an error, and thus collided. The result was four deaths and forty-nine injuries—all because of an illusion.

FIGURE 3.20

Illusions of Area or Shape

Illusions of area or shape can be quite powerful. (A) In this drawing, known as the Poggendorf illusion, which of the three lines on the right continues the line on the left? Check your answer with a ruler. (B) In this drawing, are the horizontal lines straight or bent in the middle? Again, check for yourself. (C) Finally, in this drawing, are the letters tilted or vertical? When you check, you'll see why sometimes you can't believe what you think you see.



One final point: illusions are not limited to visual processes. Indeed, there are numerous examples of illusions for our other sensory modalities, including touch and audition (Sekuler & Blake, 1990; Shepard, 1964). One well-known illusion that you can demonstrate for yourself is that of touch temperature. First place one hand in a container of hot water and the other hand in cold water. Then place *both* hands in a container of lukewarm water. What do you feel? Most people experience a dramatic difference in perceived temperature between the two hands; the hand initially placed in hot water feels the lukewarm water as cool, whereas the hand initially placed in cold water feels it as hot. How do we explain this illusion? When we touch an object, the temperature of the area of our skin in contact with it shifts toward that of the object's surface. So, when we perceive an object to be warm or cool, our experience stems partly from the temperature difference between the object and our skin, not solely from the actual temperature of the object.

Some Key Perceptual Processes:

Pattern and Distance

It can be argued that perception is a practical process, for it provides living organisms with information essential to survival in their normal habitat. The specific nature of this information varies greatly with different species. For example, frogs must be able to detect small moving objects in order to feed on insects, whereas porpoises require sensory input that enables them to navigate turbulent and murky ocean waters. Nonetheless, it is probably safe to say that virtually all living creatures need information concerning (1) what's out there and (2) how far away it is. Humans are no exception to this general rule, and we possess impressive perceptual skills in both areas.

Pattern Recognition: What's Out There? The ability to read the words on this page depends on the ability to recognize small black marks as letters and collections of such marks as words. How do we accomplish this task? An early explanation for this phenomenon was the *template-matching theory*. According to this theory, we have many **templates**, or specific patterns, stored in our memories for various visual stimuli that we encounter. Thus, if a visual stimulus—say a letter—matches one of the templates, we recognize it; if it does not, we search for another that does match. As you may have already guessed, this theory is impractical, since it requires that we store an almost infinite number of these templates in our memories in order to be able to recognize even variants of the same letter. Additionally, the template-matching theory does not explain our ability to read at rates exceeding hundreds of words per minute or to recognize visual stimuli almost instantly, even when they're viewed from different perspectives (Pinker, 1984).

Templates: *Specific patterns stored in our memories for various visual stimuli that we encounter.*

FIGURE 3.21

Bottom-Up Theories Do Not Explain Perception of Reversible Figures

Bottom-up theories based on feature analysis cannot explain how we can see both faces and a vase in this reversible ambiguous figure, since the actual stimulus features remain constant.

A related but more viable explanation, referred to as *prototype-matching theory*, suggests that we automatically compare each letter (and perhaps word) to abstract representations of these stimuli in our memories known as **prototypes**. According to this view, we have a prototype in memory for each letter of the alphabet, based on all examples of the letter previously encountered. Thus, recognition is dependent on finding a correct match between the stimulus letter or word and a previously seen prototype. Please note that a prototype is not an exact match or a template for some visual stimulus, but a general pattern that lets us recognize a letter even when it is distorted. While some evidence supports this view (e.g., Franks & Bransford, 1971), the physiological details of this theory are not well developed (Matlin & Foley, 1992). For example, it is not yet clear how these stimuli are internally represented in our cognitive structure.

Two other approaches are the bottom-up and top-down theories of pattern recognition. As their names imply, these adopt somewhat opposite perspectives on the basic question of how we recognize patterns of visual stimuli. The *bottom-up approach* suggests that our ability to recognize specific patterns, such as letters of the alphabet, is based on simpler capacities to recognize and combine correctly lower-level features of the letters, such as lines, edges, corners, and angles. For example, our ability to recognize an A and distinguish it from other letters depends on activation of *feature detectors*, which when stimulated activate other neurons that may be described as *letter detectors*. Bottom-up theories suggest that pattern recognition is constructed from simpler perceptual abilities through a discrete series of steps (Marr, 1982). Unfortunately, bottom-up theories based on feature analysis do not explain well how people perceive ambiguous stimuli. For example, in Figure 3.21, we can see either a vase or faces, despite the fact that the stimulus pattern remains the same in both instances.

In contrast, the *top-down approach* emphasizes the fact that our expectancies play a critical role in shaping our perceptions. We often proceed in accordance with what our past experience tells us to expect, and therefore we don't always analyze every feature of most stimuli we encounter. Although top-down processing can be extremely efficient (think about the speed with which you can read this page), it can also lead us astray. Nearly everyone has had the experience of rushing over to another person who appears to be an old friend, only to realize he or she is actually a stranger. In such cases, our tendency to process information quickly from the top down can indeed produce errors.

Prototypes: *Representations in memory of various objects or stimuli in the physical world.*

KEY POINTS

- Selective attention reduces interference from irrelevant sensory sources.
- The effectiveness of warnings depends on both sensory and perceptual processes.
- The Gestalt principles of perceptual organization help us to structure the input from our sensory receptors.
- Our perceptions of the world do not change as a result of variations in sensory information.
- The top-down theory emphasizes the role that expectancies play in shaping our perceptions.
- The bottom-up theory suggests that pattern recognition stems from our ability to recognize and combine basic visual features.
- Judgments of depth and distance result from binocular and monocular cues.

Which of these theories is correct? Current evidence indicates that both play a role in pattern recognition (Matlin & Foley, 1992). When we have strong expectations or we are in a familiar context, we often opt for speed and adopt a top-down approach. However, when we are dealing with unfamiliar situations or stimuli, bottom-up processing often dominates. In many situations, both processes may occur at once. In summary, our efforts to make sense out of the world around us tend to take whatever form is most efficient in a given context.

DISTANCE PERCEPTION: HOW FAR AWAY IS IT? Our impressive ability to judge depth and distance occurs because we make use of many different cues in forming such judgments. These cues can be divided into two categories, *monocular* and *binocular*, depending on whether they can be seen with only one eye or require the use of both eyes.

Monocular cues to depth or distance include the following:

1. *Size cues*: The larger the image of an object on the retina, the larger the object is judged to be; in addition, if an object is larger than other objects, it is often perceived as closer.
2. *Linear perspective*: Parallel lines appear to converge in the distance; the greater this effect, the farther away an object appears to be.
3. *Texture gradient*: The texture of a surface appears smoother as distance increases.
4. *Atmospheric perspective*: The farther away objects are, the less distinctly they are seen—smog, dust, haze get in the way.
5. *Overlap* (or interposition): If one object overlaps another, it is seen as being closer than the one it covers.
6. *Height cues* (aerial perspective): Below the horizon, objects lower down in our field of vision are perceived as closer; above the horizon, objects higher up are seen as closer.
7. *Motion parallax*: When we travel in a vehicle, objects far away appear to move in the same direction as the observer, whereas close objects move in the opposite direction. Objects at different distances appear to move at different velocities.

As you can see, much of our ability to perceive depth is based on the use of *monocular cues*. However, we also rely heavily on **binocular cues**—depth information based on the coordinated efforts of both eyes. Binocular cues for depth perception stem from two primary sources:

1. *Convergence*: In order to see close objects, our eyes turn inward, toward one another; the greater this movement, the closer such objects appear to be.
2. *Retinal disparity* (binocular parallax): Our two eyes observe objects from slightly different positions in space; the difference between the two images is interpreted by our brain to provide another cue to depth. Figure 3.22 contains a stereogram: a pattern of dots in which we can perceive 3-D images—thanks in part to retinal disparity.

Monocular Cues: *Cues to depth or distance provided by one eye.*

Binocular Cues: *Cues to depth or distance provided by the use of both eyes.*

The lists of monocular and binocular cues are by no means exhaustive. By using the wealth of information provided by these and other cues (Schiffman, 1990), we can usually perceive depth and distance with great accuracy.

FIGURE 3.22

Retinal Disparity and Stereograms

Retinal disparity is the basis for perceiving 3-D images in stereograms. (1) Hold the book about a foot away from your eyes. (2) Note the pair of circles at the top of the stereogram. (3) Relax your gaze as if you were looking beyond the page, until you see each mark split in two. (4) Widen the split until the two central marks meet and merge. Depth should pop out at you! Now move your gaze slowly into the image. Do you see the train engines?

(*Source*: Stereogram puzzle by Dan Dyckman. Reprinted from GAMES magazine, 19 West 21st Street, New York, NY 10010. Copyright © 1993 B. & P. Publishing Co., Inc.)

THE PLASTICITY OF PERCEPTION: *To What Extent Is It Innate or Learned?*

Imagine a man blind from birth whose sight is suddenly restored through a miraculous operation. Will his visual world be the same as yours or mine? Will it be orderly and consistent with his expectations? Or will he experience a chaotic swirl of colors, brightnesses, and meaningless shapes? This intriguing question has often served as the basis for exploring the nature-nurture controversy. In other words, to what extent are aspects of perception learned or hereditary?

PERCEPTION: *Evidence That It's Innate*

Evidence that perception is innate stems from two lines of research. The first involves people like the one described above—people born blind (or blinded soon after birth) whose sight is later restored through medical procedures. If perception is innate, then such persons should be able to see clearly immediately after recovery from surgery. Although cases like this are few in number and the results often vary, many of these individuals can make at least partial sense out of the visual world soon after their sight is restored. For example, they can detect and follow moving objects, suggesting that some aspects of visual perception may indeed be innate (Von Senden, 1960). However, certain complications require us to be cautious in making even limited interpretation of these findings. For example, it is difficult to know precisely when

recovery from a medical procedure is sufficient to allow for "normal" vision. This leaves open the question of when the patient should be tested for perceptual abilities.

Additional evidence suggesting that perception is innate is provided by research with very young subjects, such as babies only a few hours or days old. Studies have explored numerous perceptual abilities, particularly auditory and visual abilities, that are present at birth or shortly afterward (Schiffman, 1990). In one such study, infants slightly more than three days old were exposed to squares of colored light (blue, green, yellow, red) and to gray light of equal brightness. The results showed that infants spent more time looking at every one of the colored stimuli than at the gray—an indication that ability to perceive color is present soon after birth (Adams, 1987).

In another study, Balogh and Porter (1986) exposed newborns only a few hours old to one of two aromas—ginger or cherry—for about twenty-four hours. One odor was present on a gauze pad in each infant's bassinet. After the initial exposure, two pads, each containing a different smell, were placed in each bassinet, and the amount of time the infant spent orienting toward each one during brief test periods was observed. Female infants showed a marked preference for the familiar odor—the one to which they had previously been exposed—while male infants showed no preference. It is not certain why this gender difference occurred; other research suggests, however, that at all ages females are superior to males in identifying specific odors (Doty et al., 1984). Thus, our perception of smell may also be present at or soon after birth. In any case, studies like these suggest that some aspects of perception are innate or at least that they appear early in life.

Perception: Evidence That It's Learned

On the other hand, there is considerable evidence for the view that key aspects of perception are learned. In a famous series of studies, Blakemore and Cooper (1970) raised kittens in darkness except for brief periods, during which the kittens were exposed to either horizontal or vertical stripes. When later released from their restricted environment, the kittens showed what seemed to be permanent effects of their earlier experience. Those exposed only to vertical lines would respond to a long black rod when it was held in an upright position, but ignored it when it was held horizontally. In contrast, kittens exposed only to horizontal lines would respond to a rod only when it was held in a horizontal position, ignoring it when it was presented vertically. Despite the fact that the kittens' visual systems were undamaged—at least in any measurable physical sense—their restricted visual experience appeared to produce permanent perceptual deficits.

Additional evidence for the role of learning in perception comes from studies in which human volunteers wear special goggles that invert their view of the world and reverse right and left. Such persons initially experience difficulty in carrying out normal activities with their goggles on, but soon adapt and do everything from reading a book to flying a plane (Kohler, 1962). These findings, and others, suggest that we do indeed learn to interpret the information supplied by our sensory receptors.

Must We Resolve the Nature-Nurture Controversy?

The findings we've reviewed thus far offer no simple resolution to the nature-nurture issue; other studies involving both animals and humans are equally inconclusive. Some studies show that certain aspects of visual per-

ception seem to be present without previous sensory experience, whereas other aspects develop only through experience with the external world (Wiesel, 1982).

Confronted with this mixed evidence, most psychologists accept that perception is influenced both by innate factors *and* by experience. For example, consider the strange case of Virgil—a fifty-year-old man who regained his sight after forty-five years of blindness (Sacks, 1993). The fact that Virgil could immediately detect visual features, such as letters, objects and colors, suggested the influence of nature. However, Virgil could not "see" in the true sense. Learning even simple visual relationships required great effort, since most of his knowledge of the world had come to him through the sense of touch.

In sum, perception is plastic in the sense that it can be, and often is, modified by our encounters with physical reality. However, perception may also be strongly affected by innate tendencies and principles. So the answer to the question "Must we resolve the nature-nurture controversy?" is a resounding *no,* since it is clear that learning *and* biology both play critical roles in perception.

KEY POINT

- Both nature and nurture are important determinants of the ways we perceive the world around us.

EXTRASENSORY PERCEPTION: *Perception without Sensation?*

Have you ever wondered if we have a "sixth sense"? In other words, can we gain information about the external world without use of our five basic senses? Many persons believe we can and accept the existence of **extrasensory perception**—literally, perception without a basis in sensation. The first and most basic question we can ask about ESP is "Does it really exist?" Recently this question has been recast by Bem and Hornton (1994) in terms of a hypothetical process known as **psi**. These researchers define psi as unusual processes of information or energy transfer that are currently unexplained in terms of known physical or biological mechanisms. In short, psi underlies and forms the basis for what has previously been described as ESP. Thus, in the discussion that follows, we'll use this newer term, psi, instead of the older term, ESP. What precisely is psi? And is there any evidence for its existence? In the section that follows, we will discuss some of the evidence on this intriguing topic.

Extrasensory Perception (ESP): *Perception without a basis in sensory input.*

Psi: *Unusual processes of information or energy transfer that are currently unexplained in terms of known physical or biological mechanisms. Included under the heading of psi are such supposed abilities as telepathy (reading others' thoughts) and clairvoyance (perceiving unseen objects or unknowable events).*

Parapsychologists: *Individuals who study psi and other paranormal events.*

Psi: What Is It?

Parapsychologists, those who study psi and other *paranormal events,* or events outside our normal experience or knowledge, suggest there are actually several distinct forms of psi (or ESP). One form of psi is *precognition,* the ability to foretell future events. Fortunetellers and even stock market analysts often earn their livings from the supposed ability to make such predictions. *Clairvoyance,* the ability to perceive objects or events that do not directly stimulate your sensory organs, is another form. While playing cards, if you somehow know which one will be dealt next, you are experiencing clairvoyance. *Telepathy,* a skill used by mind readers, involves the direct transmission of thought from one person to the next. Another phenomenon often associated with psi is *psychokinesis,* the ability to affect the physical world purely through thought. Bending spoons or moving objects with your mind or per-

forming feats of levitation (making objects rise into the air) are examples of psychokinesis.

Psi: Does It Really Exist?

The idea of a mysterious sixth sense is intriguing, and many people are passionately convinced of its existence (Bowles & Hynds, 1978). But does it really exist? Most psychologists are skeptical about the existence of psi for several reasons. The first, and perhaps the most important, reason for doubting its existence is the repeated failure to replicate instances of psi; that is, certain procedures yield evidence for psi at one time but not at others. Indeed, one survey failed to uncover a single instance of paranormal phenomena that could be reliably produced after ruling out alternative explanations such as fraud, methodological flaws, and normal sensory functioning (Hoppe, 1988). Moreover, it appears that the more controlled studies of psi are, the less evidence for psi they provide (Blackmore, 1986).

Second, present-day scientific understanding states that all aspects of our behavior must ultimately stem from biochemical events, yet it is not clear what physical mechanism could account for psi. In fact, the existence of such a mechanism would require restructuring our view of the physical world. Nevertheless, major changes in our knowledge are still occurring, and it is still possible that a mechanism accounting for psi could be discovered.

Third, much of the support for psi has been obtained by persons already deeply convinced of its existence. As we noted in chapter 1, scientists are not immune to being influenced in their observations by their own beliefs. Thus, while studies suggesting that psi exists may represent a small sample of all research conducted on this topic, perhaps only the few experiments yielding positive results find their way into print; perhaps the many "failures" are simply not reported.

Recent evidence, however, has caused researchers to reexamine their beliefs in this respect, largely because of studies employing the *ganzfield procedure*—a procedure used to test for telepathic communication between a *sender* and a *receiver*. Using this procedure, parapsychologists have attempted to eliminate flaws that caused scientists to criticize much of the earlier research on psi. Receivers in the ganzfield procedure are placed in a comfortable chair in a soundproof room. Translucent Ping-Pong ball halves are taped over the receivers' eyes, and headphones are placed over their ears. A red floodlight directed toward the eyes produces a homogenous visual field, and white noise is played through the headphones to mask any outside noises.

The sender is usually secluded in a separate room and asked to concentrate on a "target" visual stimulus, such as a photograph or a brief videotape. Simultaneously, the receiver provides an ongoing verbal report of mental images that he or she experiences. After about thirty minutes, the receiver is presented with several stimuli and, without knowing which was the "target" stimulus on which the sender concentrated, is asked to rate the extent to which each stimulus matches the imagery he or she experienced during the ganzfield period. If a high proportion of the receivers' ratings are assigned to "target" stimuli, it is assumed to be evidence for psi. A recent evaluation of studies that used the ganzfield procedure suggest that receivers are significantly more accurate in selecting target stimuli than would be explained by chance (Bem & Honorton, 1994). While even critics of psi theories are intrigued by the results of these studies, the critics remain skeptical and await the results of additional research in this area (Hyman, 1994).

KEY POINT

- Most psychologists remain skeptical about the existence of psi (ESP).

Making Psychology Part of Your Life

The Danger of Stereo Headsets: Let's Turn Down the Volume

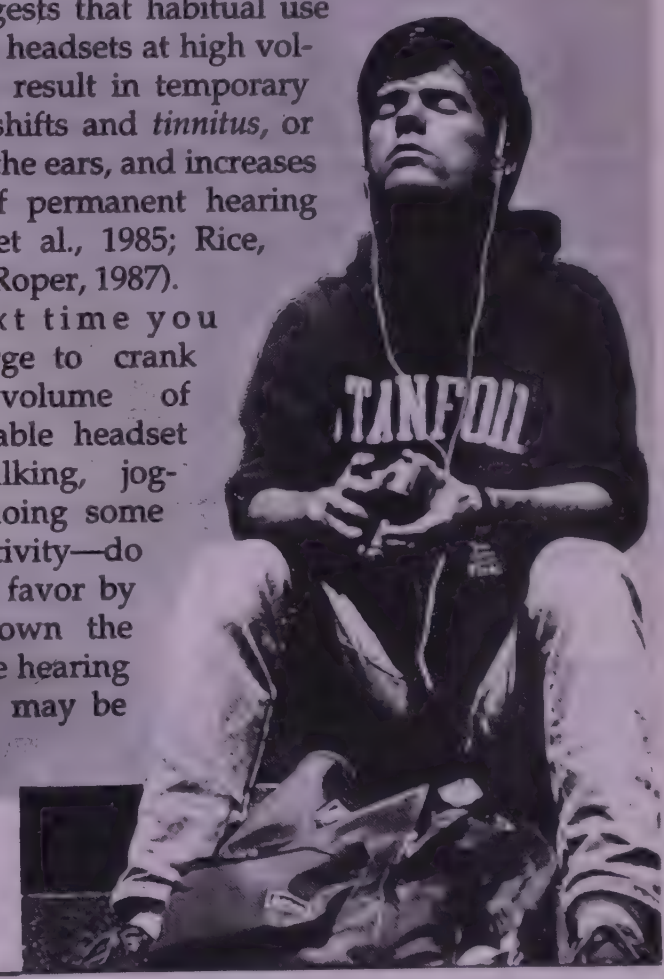
If you've experienced the clamor of traffic during rush hour, the deafening roar of a jet taking off, or the piercing blast of a jackhammer digging up city streets, you're already familiar with the growing problem of *noise pollution*. Noise has become a pervasive part of everyday living, and increasing evidence suggests that noise pollution affects aspects of our physical and mental health, task performance, and social behavior (Matlin & Foley, 1992).

Although many sources of noise in our environment are beyond our control, people often bring hearing-related problems on themselves. Psychologists and other health professionals are becoming increasingly concerned with the rapid increase in use of portable stereo headset radios and CD players. Millions of these devices are sold each year in the United States, primarily to young people (Monroe, 1990). One problem with their use is that these headsets produce sound intense enough to cause varying degrees of hearing loss (Rice, Breslin, & Roper, 1987).

Three types of hearing loss are usually distinguished: *temporary threshold shift* (TTS), a short-term and reversible elevation of the level at which sounds are first heard; *permanent threshold shift* (PTS), nonreversible hearing loss from long-term exposure to noise; and *acoustic trauma*, permanent hearing loss stemming from brief exposure to extremely intense noise, such as an explosion (Jones & Broadbent, 1987). Even brief exposure to certain levels of sound intensity can cause a measurable shift in hearing ability. For example, exposure to 90-decibel sound levels—the level of noise that might be present in a crowded restaurant—can produce a TTS of nearly 20 decibels after only one and one-half hours of sound exposure.

So why all the fuss over stereo headsets? Consider, for example, the results of a study by Navarro (1990) in which researchers examined fifty portable stereo headsets to determine if they had the potential to damage hearing. The decibel levels were measured at three volume settings: one-third, two-thirds, and full volume. The results showed that headsets produce an average of 87 decibels at one-third of their full volume, 100 decibels at two-thirds, and 108 decibels at full volume. Thus, it should be clear that portable stereo headsets have the potential to produce serious hearing loss even at seemingly low volume settings, particularly among persons who listen to them often and for extended periods of time. Indeed, some evidence suggests that habitual use of portable headsets at high volumes does result in temporary threshold shifts and *tinnitus*, or ringing of the ears, and increases the risk of permanent hearing loss (Lee et al., 1985; Rice, Breslin, & Roper, 1987).

So next time you get the urge to crank up the volume of your portable headset while walking, jogging, or doing some other activity—do yourself a favor by turning down the sound. The hearing you save may be your own.



Stereo headsets, one source of noise that *can* be controlled, have the potential to cause permanent damage to the ears.

Summary and Review Key Points

Sensation Key Terms sensation, p. 90; perception, p. 90; sensory receptors, p. 91 transduction, p. 91; absolute threshold, p. 92; signal detection theory, p. 92; difference threshold, p. 93; just noticeable difference (jnd), p. 93; subliminal perception, p. 93; sensory adaptation, p. 94	• Sensory receptors transduce raw physical energy into neural impulses, which are then interpreted by our central nervous system. • The absolute threshold is the smallest magnitude of a stimulus that can be detected 50 percent of the time. • Signal detection theory helps to separate sensitivity from motivational factors. • Sensory adaptation serves a useful function by allowing us to focus on important changes in our environment.
Vision Key Terms: cornea, p. 95; pupil, p. 95; iris, p. 95; lens, p. 95; retina, p. 95 cones, p. 95; rods, p. 95; fovea, p. 97; optic nerve, p. 97; blind spot, p. 97; wavelength, p. 98 hue, p. 98; brightness, p. 98 saturation, p. 98; acuity, p. 98 nearsightedness, p. 98; farsightedness, p. 98; dark adaptation, p. 98; saccadic movements, p. 99 trichromatic theory, p. 99; negative afterimage, p. 100; opponent-process theory, p. 100; feature detectors, p. 101; simple cells, p. 101; complex cells, p. 101; hypercomplex cells, p. 101; prosopagnosia, p. 101	• The physical stimulus for vision consists of electromagnetic waves that stimulate the rods and cones in the retina. • Our rich sense of color stems from mechanisms at several levels of our nervous system. Two leading theories that explain how we perceive color are trichromatic theory and opponent process theory. • Visual perception is a hierarchical process. At successive stages, increasingly complex visual information is analyzed and compiled—eventually yielding a coherent and flowing visual world. • The basic building blocks of visual perception begin with feature detectors—neurons in the visual cortex that respond when particular types of stimuli, with characteristic features, are detected. Perception continues with integration of this information at higher levels in the brain.
Hearing Key Terms: pinna, p. 103; cochlea, p. 103 pitch, p. 104; timbre, p. 104 place theory, p. 105; frequency theory, p. 105; localization, p. 106	• The physical stimulus for hearing consists of sound waves that stimulate tiny hair cells in the cochlea. • Place theory and frequency theory help explain how we perceive pitch. • The sound shadow created by our head helps us localize the source of sound.
Touch and Other Skin Senses Key Terms: Braille alphabet, p. 107; gate-control theory, p. 108; endorphins, p. 110	• The physical stimulus for sensations of touch is a stretching of or pressure against receptors in the skin. • Sensations of pain originate in free nerve endings throughout the body. • Observed cultural differences in pain perception result from the powerful forces of learning—not from physical differences.
Smell and Taste	• The physical stimulus for smell consists of molecules of various substances in the air; these stimulate receptor cells in the olfactory epithelium. • The sensory receptors for taste are located in papillae on the tongue. • The presence of pleasant fragrance in the workplace can have beneficial effects on work-related behaviors.

Kinesthesia and Vestibular Sense Key Terms: kinesthesia, p. 114; vestibular sense, p. 114; vestibular sacs, p. 114; semicircular canals, p. 115	• Kinesthesia informs the brain about the location of body parts with respect to each other. The physical stimulus for kinesthesia is movement, registered in receptors in joints and ligaments. • The vestibular sense provides information about body position, movement, and acceleration. Receptors for the vestibular sense are hair cells inside the fluid-filled semicircular canals.
Perception Key Terms: Gestalt psychologists, p. 118; figure-ground relationship, p. 118; laws of grouping, p. 119; constancies, p. 121; size constancy, p. 121; relative size, p. 121; shape constancy, p. 121; brightness constancy, p. 121; illusions, p. 122; templates, p. 124; prototypes, p. 125; monocular cues, p. 126; binocular cues, p. 126	• Selective attention helps us to maximize information gain by reducing interference from irrelevant sensory sources. • The effectiveness of warnings depends on both sensory and perceptual processes. • The Gestalt principles of perceptual organization help us to structure the input from our sensory receptors. • Because of perceptual constancies, our perceptions of the world do not change as much as variations in the sensory information registered by our receptors might lead us to expect. • The top-down theory of pattern recognition emphasizes the role that expectancies play in shaping our perceptions. • Bottom-up processing suggests that pattern recognition stems from the ability to recognize and combine basic visual features, such as lines, edges, corners, and angles. • Judgments of depth and distance result from binocular and monocular cues.
The Plasticity of Perception	• Both nature and nurture are important determinants of the ways we perceive the world around us.
Extrasensory Perception Key Terms: extrasensory perception (ESP), p. 129; psi, p. 129; parapsychologists, p. 129	• Most psychologists remain skeptical about the existence of psi, because careful research has failed to reproduce these phenomena reliably and because no currently known physical mechanism can account for them.

Critical Thinking Questions

Appraisal	Many psychologists would agree that conscious experience is nothing more than the result of the brain's efforts to integrate information received from the senses. Do you agree? Why? If not, offer an alternative view.
Controversy	Recent studies employing the ganzfield procedure have eliminated many of the methodological flaws present in earlier research and have demonstrated weak, but consistent, evidence for psi. Does psi exist? Or is it more likely that subsequent research will uncover methodological flaws in these studies?
Making Psychology Part of Your Life	Knowing something about the way in which we receive and process sensory information is useful for a variety of practical reasons. For example, knowing that sensitivity to smell decreases rapidly through habituation is critical, especially if you have just detected the odor of a poisonous gas! Can you think of other ways in which you can benefit from such knowledge?

Consciousness:

Awareness of Ourselves and the External World

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- *Circadian Rhythms: Their Basic Nature*
- *Circadian Rhythms: What Mechanism Underlies Them?*
- *Individual Differences in Circadian Rhythms: Of Larks and Owls*
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Do you feel more alert and energetic at some times during the day than at others? Have you ever daydreamed in class so that later you had no idea what the teacher or professor said? Have you ever stood in front of a mirror brushing your teeth while your thoughts were a thousand miles away? If so, you already know that we all experience different **states of consciousness**—levels of awareness of internal and external stimuli—every day. And when we go to sleep at night (perchance to dream!) or take some drug that affects the way we feel, these changes are even more dramatic in scope. Being familiar with these shifts, however, doesn't necessarily help us understand them. Can we really do two or more things at the same time, and if so, how? *Why* are we more alert at some times during the

day than at others? What happens when we fall asleep? What, precisely, *are* dreams? And how do various drugs affect our emotions, perceptions, and cognition?

WE ALL EXPERIENCE DIFFERENT STATES OF CONSCIOUSNESS—LEVELS OF AWARENESS OF INTERNAL AND EXTERNAL STIMULI—EVERY DAY.

Given the obvious impact of states of consciousness on many aspects of our behavior, they are clearly an important topic for the field of psychology You may be surprised to learn, therefore, that from about the 1920s until as recently as the 1960s, consciousness was largely ignored by psychologists. In fact, it was viewed by some as a slightly shady topic—one to be avoided by serious scientists. Many factors contributed to this unsettling state of affairs, but perhaps the most important was the dominance of behaviorism. As you may recall from chapter 1, Watson and other early behaviorists believed that psychology should focus only on overt, observable actions. Since consciousness cannot be directly seen or measured, they literally ruled it out as a legitimate topic of research.

Needless to state, this is no longer the case, and in recent decades consciousness has reemerged as an important topic of study. I say "reemerged" because, as noted in chapter 1, some early psychologists—the structuralists—viewed consciousness as the core topic on which psychology should focus.

Although consciousness has returned as a topic of systematic research in psychology only during the past few decades, we have already acquired a great deal of interesting—and often provocative—knowledge about it. Much of this information will be summarized in this chapter. We'll begin by considering the biological roots for at least some of our shifting patterns of consciousness: *biological rhythms*. These are naturally occurring, cyclical changes in many basic bodily processes and mental states that occur over the course of a day or longer periods of time. Next, we'll consider several aspects of what might be described as normal, *waking consciousness*. Here, we'll examine three major topics: (1) *controlled* and *automatic processing*, shifts between conscious attention to our current behavior and the kind of "automatic pilot" that seems to operate when we perform well-practiced actions such as grooming or driving; (2) the nature and impact of *daydreams* and *fantasies;* and (3) changing levels of *self-consciousness*, the degree to which we focus on ourselves rather than the external world. Next, we'll turn to what is perhaps the most profound, regular shift in consciousness we experience: *sleep*. Finally, we'll examine two external factors that sometimes produce important shifts in consciousness: *hypnosis* and the effects of various *consciousness-altering drugs*.

BIOLOGICAL RHYTHMS: Tides of Life—and Conscious Experience

States of Consciousness: *Varying degrees of awareness of ourselves and the external world.*

Biological Rhythms: *Cyclic changes in bodily processes.*

Suppose that you must schedule an appointment for a very important interview. The interviewer has a number of time slots available, so you can choose to meet with her at almost any time of day. What time will you select? Probably you have little difficulty in making a choice. Most of us are well aware of the fact that we are at our best—most alert and energetic—at certain times of the day. Thus, all other things being equal, you'll probably schedule the meeting for a time when you know that you're most likely to make a good impression (Monk & Folkard, 1983).

The existence of such shifts in our alertness or energy is one illustration of what psychologists and other scientists term **biological rhythms**—regular

CHANGING STATES OF CONSCIOUSNESS

As shown here, our states of consciousness change during the course of a single day. (*Source*: Drawing by Stevens; © 1992 The New Yorker Magazine, Inc.)

fluctuations in our bodily processes (and therefore in consciousness) over time. Many of these fluctuations occur over the course of a single day and are known as **circadian rhythms** (from the Latin words for "around" and "day"). As we'll soon see, such rhythms can exert important effects on us in many respects. Other biological rhythms take place within shorter periods of time; they are known as *ultradian rhythms*. For example, many people become hungry every two or three hours (at least while they are awake). And during sleep, periods of dreaming seem to occur at roughly ninety-minute intervals. Finally, some biological rhythms occur over longer periods, such the menstrual cycle experienced by women, which spans approximately twenty-eight days. Such rhythms often have a relationship to states of consciousness. Since circadian rhythms have received most research attention, I'll focus primarily on these, describing their basic nature, individual differences among them, and some practical implications of their existence.

CIRCADIAN RHYTHMS: Their Basic Nature

Most people are aware of fluctuations in their alertness, energy, and moods over the course of a day. Do such circadian shifts reflect actual changes in underlying bodily states? A large amount of evidence suggests that they do (e.g., Moore-Ede, Sulzman, & Fuller, 1982). Careful study has revealed that many bodily processes do indeed show daily cyclical changes. To mention just a few, it has been found that the production of various hormones fluctuates across the day; their levels are high at some points in time but much lower at others. Similarly, for many persons, core body temperature, blood pressure, and several other processes are highest in the late afternoon or evening and lowest in the early hours of the morning—although, as we'll see below, large individual differences in this respect exist.

These cyclic fluctuations in basic bodily functions are reflected in performance on many tasks. Tasks requiring physical activity are performed best at times when body temperature and other processes are at or near their peaks. The same is true for simple cognitive (mental) tasks. However, as the complexity of cognitive tasks increases, the closeness of the link between them and circadian rhythms seems to weaken. This fact is indicated clearly by the results of a study by Daniel and Potasova (1989). These researchers asked workers at a chemical factory to perform several different tasks. One was a tapping task that required rapid hand movements. Another was a relatively simple cognitive task in which participants searched for a target letter among a series of letters and, when they found it, pushed a button as quickly as possible. A third task required complex mental effort; it involved making

Circadian Rhythms: *Cyclic changes in bodily processes occurring within a single day.*

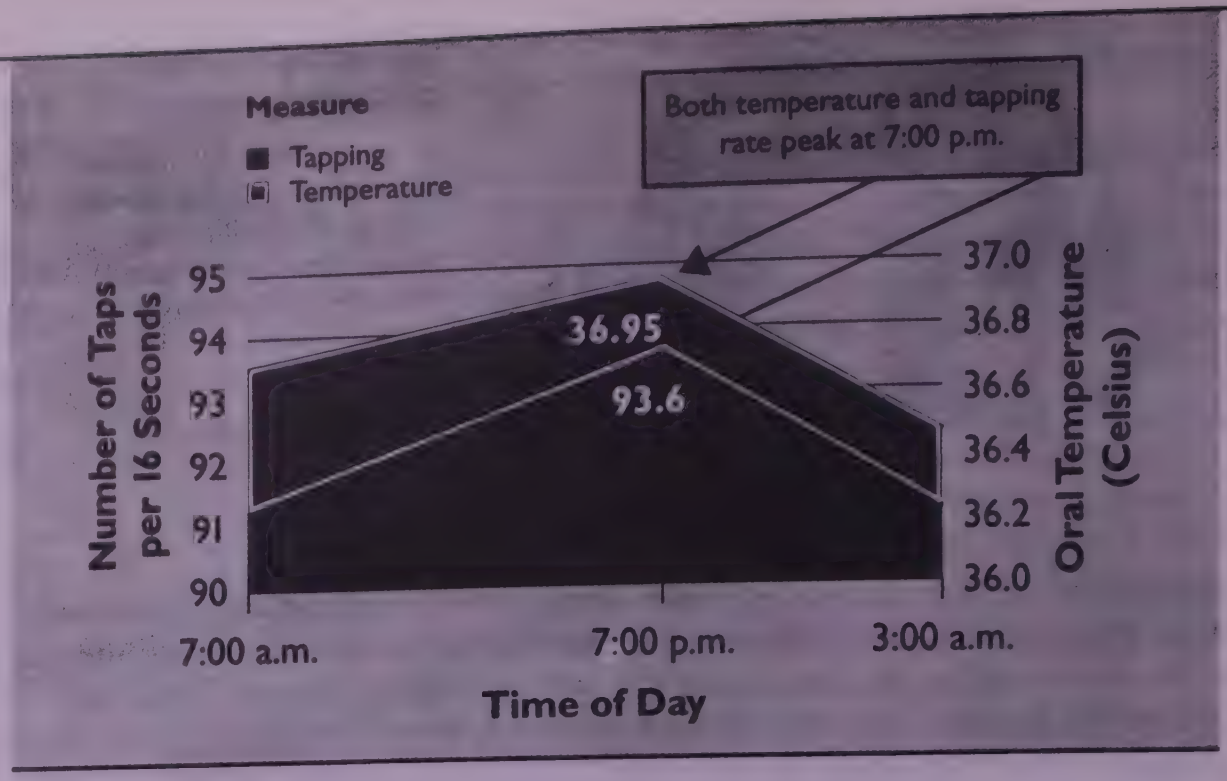


FIGURE 4.1

Circadian Rhythms, Body Temperature, and Task Performance

On both a tapping task and a relatively simple cognitive task, performance rose and fell with daily changes in body temperature. However, there was no relationship between body temperature and performance on a more complex cognitive task.
(*Source:* Based on data from Daniel & Potasova, 1989.)

grammatical transformations on a series of sentences. Participants' body temperature was recorded at several times during the day. As shown in Figure 4.1, there was a clear relationship between body temperature and performance on the tapping task. This relationship also held true for the simple visual search task. The relationship disappeared, however, for the complex sentence transformation. This pattern of findings suggests that daily fluctuations in body temperature may have a stronger impact on relatively simple tasks than on more complex cognitive ones.

CIRCADIAN RHYTHMS: What Mechanism Underlies Them?

If bodily processes, mental alertness, and performance on many tasks fluctuate regularly over the course of the day, it seems reasonable to suggest that we possess some internal biological mechanism for regulating such changes. In other words, we must possess a biological clock that times various circadian rhythms. While there is not as yet total agreement on the nature of this clock, many scientists believe that it is located in a portion of the hypothalamus—specifically, in the **suprachiasmatic nucleus** (Moore & Card, 1985). This nucleus responds to visual input from the eyes and either stimulates or inhibits activity in the pineal gland. This gland, in turn, secretes *melatonin*, a hormone with far-reaching effects. Melatonin exerts a sedative effect, reducing activity and increasing fatigue.

Suprachiasmatic Nucleus: *A portion of the hypothalamus that seems to play an important role in the regulation of circadian rhythms.*

Seasonal Affective Disorder (SAD): *Depression experienced during the winter months, supposedly stemming from a lack of exposure to sunlight.*

Exposure to daylight stimulates the suprachiasmatic nucleus, and this in turn reduces the secretion of melatonin. In contrast, darkness enhances it. Interestingly, only exposure to fairly intense light (three to five times that of ordinary room lighting) is sufficient to stimulate the suprachiasmatic nucleus. Thus, if you spent all of your time in a dimly lit environment, your biological clock would respond as if you were living in perpetual night. Melatonin secretion would be increased, and you would probably feel quite tired most of the time. Perhaps this is one reason why many people report feeling depressed if they cannot get a dose of sunlight at least occasionally during the winter months, a reaction known as **seasonal affective disorder (SAD)** (Rosenthal, 1985).

Evidence that the suprachiasmatic nucleus acts as a biological clock is provided by research indicating that when it is damaged or when neural pathways connecting it to the eyes are destroyed, circadian rhythms tend to disappear totally (Moore & Card, 1985).

Another intriguing fact is that when left to its own devices, our internal biological clock seems to operate on a twenty-five-hour rather than a twenty-four-hour day. This is indicated by research in which volunteers have lived in caves or other environments totally removed from clocks, the rising and setting of the sun, and other cues we normally use to keep track of time. Under these conditions, most persons seem to shift to a "day" of about twenty-five hours (Moore-Ede, Sulzman, & Fuller, 1982). In other words, each day they rise and go to sleep a little later, and all their activities shift accordingly. Their basic bodily functions, too, seem to shift from a twenty-four-hour cycle to this slightly longer one.

Individual Differences in Circadian Rhythms: Of Larks and Owls

Before reading further, please answer the questions in Table 4.1. How did you score? If you answered "Day" to eight or more questions, the chances are good that you are a morning person (a lark). If, instead, you answered "Night" to eight or more questions, you are probably a night person (an owl). Morning people feel most alert and active early in the day, while night people experience peaks in alertness and energy in the afternoon or evening. Such differences are more than purely subjective. Studies comparing larks and owls indicate that the two groups differ in several important ways. For example, morning people have a higher overall level of adrenaline than night people; thus, they seem to operate at a higher overall level of activation (e.g., Akerstedt & Froberg, 1976). Similarly, as you might expect, morning people experience peaks in body temperature earlier in the day than night people (Wallace, 1993). While morning people have temperature peaks before noon, night people often experience their peaks in temperature in the evening, around 6:00 p.m. or even later.

In addition, some findings suggest that larks and owls also differ with respect to relatively subtle fluctuations in cognitive states. Not surprisingly, morning people report feeling more alert and do better on many cognitive

Respond to each of the following items by circling either "Day" or "Night."

1. I feel most alert during the	Day	Night
2. I have most energy during the	Day	Night
3. I prefer to take classes during the	Day	Night
4. I prefer to study during the	Day	Night
5. I get my best ideas during the	Day	Night
6. When I graduate, I prefer to find a job during the	Day	Night
7. I am most productive during the	Day	Night
8. I feel most intelligent during the	Day	Night
9. I enjoy leisure-time activities most during the	Day	Night
10. I prefer to work during the	Day	Night

Table 4.1

Are You a Lark or an Owl?

If you answer "Day" to eight or more of these questions, you are probably a morning person. If you answer "Night" to eight or more, you are probably a night person. (*Source:* Based on items from Wallace, 1993.)

tasks early in the day. In contrast, night people report feeling more alert and do better on such tasks later in the day. More surprising is the fact that these two groups also differ with respect to times at which they are most susceptible to *hypnotism*—a topic we'll consider later in this chapter. Morning people seem to be most susceptible to hypnosis in the morning and early afternoon, while night people are most susceptible to hypnosis in the afternoon and evening (Wallace, 1993).

DISTURBANCES IN CIRCADIAN RHYTHMS: *Jet Lag and Shift Work*

Under normal conditions, the existence of circadian rhythms poses no special problems. Most people are aware of their personal highs and lows and try to schedule their activities accordingly. Unfortunately, though, there are circumstances under which circadian rhythms may get badly out of phase with our daily activities.

The first of these situations occurs as a result of modern travel—especially by jet plane. When individuals cross several time zones, they often experience considerable difficulty in adjusting to their new location. The reason for this is clear: Their internal biological clocks are calling for one level or type of activity, while the external world is calling strongly for another one. I experienced such effects recently myself, when I returned home after a month in France. My plane left Paris at 1:00 p.m. and, because of the six-hour time difference, arrived in New York at 2:45 p.m. I caught another plane two hours later and finally got home at about 7:00 that evening. Although my clock read 7:00 p.m., my biological clock was reading 1:00 a.m., and I was *tired*. I forced myself to stay up until about 10:30 p.m. (4:30 a.m. according to my biological clock) and fell asleep immediately. However, I awoke again about three hours later, because my internal biological clock was reading "7:30 a.m.—time to get up." These effects gradually disappeared over the course of the next six days, as my internal biological clock readjusted to my own time zone.

A second cause of difficulties with respect to circadian rhythms is *shift work*. Here, individuals must work at times when they would normally be sleeping (say midnight to 8:00 a.m.). To make matters worse, shift workers often face a schedule in which they work on one shift for a fairly short period (say a week), get two days off, and then work on another shift. The results are, for many people, quite unsettling. Even if you've never had a job involving shift work, you have probably experienced such effects after winter or spring break. During these vacation periods, you may have stayed up late and slept in every day. Then, when you returned to school, you probably found readjusting to early morning classes a drag, to say the least. Shift workers, who must constantly reset their biological clocks, suffer even stronger effects, such as high levels of fatigue and serious sleep disorders. In addition, growing evidence suggests that they may suffer other adverse effects, such as increased rates of heart disease and ulcers; increased rates of automobile and industrial accidents; and increased use of alcohol, sleeping pills, and other drugs, relative to non–shift workers (Angerspach et al., 1980; Liddell, 1982). The economic loss resulting from these effects is staggering and was once estimated at more than $70 billion in the United States alone (Bickford, 1988). Can anything be done to reduce such costs? For encouraging information on this issue, see the following **Point of It All** section.

KEY POINTS

- Biological rhythms involve regular fluctuations in our bodily processes.
- We possess a biological clock that places many of our bodily processes on a twenty-four-hour cycle.
- Large individual differences in circadian rhythms exist; some people are larks, while others are owls.
- Jet lag and shift work can cause disturbances in circadian rhythms.

The Point of It All

Countering the Negative Effects of Shift Work

Shift work is a growing trend in many industries. The costs of modern industrial equipment make it almost a necessity to operate many factories on a round-the-clock basis. Persons who face shift-work schedules, however, often report high levels of dissatisfaction with them. And little wonder that they do, given the havoc such schedules play with their biologically driven circadian rhythms. This leads to a practical question: Since shift work is a reality of modern life, can anything be done to lessen its potentially harmful effects? In fact, basic knowledge about the nature of circadian rhythms points to some simple steps that might be of considerable help in this respect.

First, research on adjustments in circadian rhythms suggests that it is easier for individuals to get their biological clocks back into phase with the external world when they have to *delay* them rather than advance them. In other words, it is easier to stay up a few hours later and to reset one's biological clock in this manner than to go to sleep earlier and try to move it ahead. Second, it is easier for individuals to reset their biological clocks if they work on a particular shift for a longer period of time, and then have several days in between shifts. This is because human beings seem able to reset their internal clocks by about one hour each day.

Does taking account of these findings in planning shift work actually help employees adjust to changing shifts? A study by Czeisler, Moore-Ede, and Coleman (1982) indicates that it does. These researchers exposed one group of male shift workers either to a standard rotating shift pattern of seven days on one shift followed by rotation to the earlier (rather than later) shift, or to a revised approach in which employees stayed on a particular shift for several weeks and then were rotated to a later one. Results indicated that the workers were much more satisfied with the revised schedule than with the standard one. Further, their productivity increased, their health improved, and their rate of turnover (voluntary quitting) dropped appreciably. In other words, findings indicated that a work schedule that took account of the basic properties of circadian rhythms was much more effective than one that ignored them.

More recent efforts to help people cope with the stress of shift work have adopted a somewhat different approach based on the role of the suprachiasmatic nucleus in regulating circadian rhythms. In order to help night workers at nuclear power plants to stay awake in the early morning hours, one company—Light Sciences, Inc.—has developed a lighting system that simulates the normal cycle of strengthening and weakening sunlight during the day (Noble, 1993). This system, which is currently being tested in several generating plants in the United States, gradually brightens and then dims during the 11:00 p.m. to 7:00 a.m. shift. It is hoped that these changes will "trick" the visual system into reversing the times of peak alertness and drowsiness that are part of the normal circadian cycle. To help strengthen such effects, workers wear dark glasses when they must leave the light-controlled areas of the plant for ones that are more brightly lit during the "dim" part of their shift. And they wear sunglasses when going home in the morning to avoid exposure to direct sunlight. While final results are not yet available, early findings are encouraging with respect to increased alertness—and decreased errors.

The moral of this project is clear: Human beings are adaptive and can, to an extent, cope with almost any kind of work schedule. However, schedules designed to coordinate with rather than challenge employees' basic biological rhythms are almost certain to prove more cost effective, as well as more compassionate, in the long run.

Circadian Rhythms and Shift Work

Many factories operate twenty-four hours a day. People who work night shifts must adjust their circadian rhythms to fit these schedules.

Waking States of Consciousness: Everyday Experience

One of the first things I learned about teaching was this: No matter what you are saying and no matter how interesting it is, only part of the class is listening at any given time. Why? One answer relates to the topic of this chapter: While many members of the class are paying attention to your words, others are lost in their own thoughts, daydreaming, planning dinner, and so on. After a while, they may tune in again on what you're saying, but then may shift back into some other state of consciousness. Such fluctuations are a normal part of life, for during our waking hours, we shift frequently between contrasting states of consciousness. This section focuses on several of these recurring or routine states of consciousness.

Controlled and Automatic Processing: The Limits of Attention

Have you ever tried to carry on conversations with two different people at once? If so, you already know a basic fact about human consciousness: Our attentional or *information-processing* capacities are quite limited. We simply don't have the ability to focus on several different stimuli or events at once. Rather, we find it necessary to shift back and forth between events that we wish to make the center of our current attention. If this is so, how do we manage to perform two or more activities at once, for example, combing our hair while thinking about the day's coming events? The answer seems to involve the fact that there are two contrasting ways of controlling ongoing activities—different levels of attention to, or conscious control over, our own behavior (Logan, 1985, 1988).

The first level is the "automatic pilot" to which I referred at the start of this chapter, when I asked whether you have stood in front of a mirror grooming while your thoughts were far away. Psychologists call this **automatic processing** because it involves the performance of activities with relatively little conscious awareness. Such processing seems to make little demand on our attentional capacity. Thus, several activities, each under automatic control, can occur at the same time (Shiffrin & Schneider, 1977; Shiffrin & Dumais, 1981). You are demonstrating automatic processing when you drive your car and listen to the radio at the same time. Automatic processing, with respect to a given activity, tends to develop with practice, as the components of the activity become well learned and associated with specific stimulus conditions.

In contrast, **controlled processing** involves more effortful and conscious control of behavior. While it is occurring, you direct careful attention to the task at hand and concentrate on it. Obviously, processing of this type does consume significant attentional capacity. As a result, only one task requiring controlled processing can usually be performed at a time.

Automatic Processing: *Processing of information with minimal conscious awareness.*

Controlled Processing: *Processing of information with relatively high levels of conscious awareness.*

Research on the nature of automatic and controlled processing suggests that they differ in several important respects. First, as you might guess, behaviors that have come under the control of automatic processing are performed more quickly and with less effort than ones that require controlled processing (Logan, 1988; Newell & Rosenbloom, 1981). In addition, automatized acts, but not controlled ones, can be initiated without conscious intention; they are seemingly triggered automatically, by specific stimulus conditions or events (Norman & Shallice, 1985). In fact, it may be difficult to inhibit automatized actions once they are initiated. Finally, within limits, nei-

ther the accuracy nor the speed of automatic processing is strongly affected by *attentional load*—the number of different items, objects, or operations with which we must deal.

This fact was demonstrated for the first time by Schneider and Shiffrin (1977) in a famous series of experiments. In one of these studies, participants were asked to search for numbers contained in a list of letters. On some trials they searched for a single target (for instance, the number 7). On others, they searched for as many as four different targets at once (such as the numbers 1, 4, 7, 8). After many practice trials, participants were able to search for the four targets almost as quickly as they could search for one. This was interpreted as evidence for the fact that the participants had shifted to automatic processing in performing this task.

TASKS REQUIRING CONTROLLED PROCESSING

Many complex tasks can't be performed automatically; they require our full attention and absorb a large portion of our information-processing capacities.

Taking these differences into account, it is clear that neither controlled nor automatic processing necessarily has an edge; both offer a mixture of advantages and disadvantages. As we have seen, automatic processing is rapid and efficient but relatively inflexible. Controlled processing is slower but is more flexible and open to change. Clearly, both have their place in our efforts to deal with information from the external world.

One final point: automatic and controlled processing are not hard-and-fast categories, but rather ends of a continuum. On any given task, individuals may operate in a relatively controlled or a relatively automatic manner.

In sum, it seems that we have a strong tendency to adopt automatic processing whenever feasible. Given our limited capacity for attending to many simultaneous stimuli and for processing information generally (see chapters 6 and 7), this tendency offers major benefits. At the same time, though, our readiness to use our automatic pilot can exact important costs. Whatever the balance between the relative pluses and minuses, the important point to remember is this: Even during waking activities, we can and often do shift back and forth between contrasting levels of awareness or consciousness.

DAYDREAMS AND FANTASIES: Self-Induced Shifts in Consciousness

Sigmund Freud once stated, "A happy person never fantasizes; only an unsatisfied one" (1908, p. 136). If that comment is true, most of us must be very unhappy, for most of us regularly have **daydreams** or **fantasies**—imaginary events or scenes that we experience while we are awake (Singer, 1975). Further, it is clear that for many people such experiences can be quite intense, blotting out the external world at least temporarily. But what do people daydream about? And do these self-generated shifts of consciousness serve any function? It is on these questions that we will now focus.

THE CONTENT OF DAYDREAMS AND FANTASIES: MAJOR THEMES What was the content of your last daydream? If you are like most people, it can probably be placed under one of the these headings: success or failure (you imagined receiving straight A's or failing an important test); aggression or hostility (you fantasized about evening the score with someone who angered you); sexual or romantic fantasies; guilt (you tortured yourself once again over something you should or shouldn't have done); or problem solving (you

Daydreams: *Imaginary scenes or events that occur while a person is awake.*

Fantasies: *Imaginary events or scenes that a person experiences while awake.*

imagined yourself working on some task or solving some problem). Of course, many other themes exist; these are merely the most common ones.

While a majority of persons report daydreaming at least occasionally, large individual differences exist with respect to this activity. First, people differ greatly in the frequency with which they daydream or fantasize (Lynn & Rhue, 1986). While some report spending up to half their free time in this activity, others indicate that they rarely have fantasies or daydreams (Silva & Kirsch, 1992). Second, the intensity of such experiences also varies greatly. Some persons report that their fantasies and daydreams are so vivid and life-like that they are almost real and may even become confused with reality. If such experiences are not readily controlled by the persons who have them, they may be said to border on being **hallucinations**—vivid perceptual experiences that occur in the absence of an external stimulus. Such experiences are usually associated with severe psychological disorders, but they occasionally occur among non–mentally ill individuals as well (Bentall, 1990). For most persons, however, fantasies and daydreams are much less intense and far less involving. Interestingly, as we'll note in a later section, persons who have intense and frequent fantasies turn out to be more susceptible to hypnosis than those who do not (Lynn, Rhue, & Weekes, 1990).

Daydreams and Fantasies: What Function Do They Serve? If people spend a considerable amount of time engaging in daydreams and fantasies—changing their own consciousness, if you will—then these activities must serve some useful function. But what, precisely, do they accomplish? No clear-cut answer to this question has as yet emerged, but existing evidence points to several interesting possibilities.

First, daydreams and fantasies may serve as a kind of safety valve, permitting persons to escape, however briefly, from the stresses and boredom of everyday life. Perhaps this is one reason why many students tend to daydream in class or while reading their textbooks. (Not this one, I hope!)

Second, daydreams and fantasies often provide us with a ready means of altering our own moods, primarily in a positive direction. If you've ever felt happier after a daydream filled with desirable activities and events, you are already familiar with such benefits (Forgas & Bower, 1988).

Third, it is possible that daydreams and fantasies help people find solutions to actual problems in their lives. By imagining various behaviors and the outcomes they may produce, we can examine potential courses of action carefully and from the safe perspective of our own minds. This can help us formulate useful plans of action.

Finally, fantasies may play an important role in the self-regulation of behavior. By imagining negative outcomes, people may strengthen their inhibitions against dangerous or prohibited behaviors (Bandura, 1986). Similarly, by dreaming about potential rewards, people may enhance their own motivation and performance. In sum, fantasies and daydreams may be much more than a pleasant diversion; they may actually yield substantial benefits to those who choose to induce them.

Self-Consciousness: Some Effects of Looking Inward

Hallucinations: *Sensory experiences that occur in the absence of external stimuli yet have the full force of impact of real events or stimuli.*

What do you do when you pass a mirror? If you are like most people, you stop, however briefly, and examine your appearance. When you do, you are also, in a sense, changing your current state of consciousness. Before you passed the mirror, you were probably thinking about something other than yourself. Now, at least while you stand in front of the glass, your thoughts

are focused on yourself. Psychologists term this focus **self-consciousness**, and they have uncovered much about its causes and effects. We'll first consider one influential theory concerning self-consciousness and then turn to some of the surprising effects of entering this state.

The Control Theory of Self-Consciousness: Self-Regulation of Behavior Think for a moment about how the thermostat in your house or apartment works. In essence, it continuously compares the level of temperature you have set to the actual temperature in the room. When the temperature is too cold or too hot, the thermostat closes a circuit that turns on the furnace or air conditioner. In what they term the **control theory of self-consciousness**, Carver and Scheier (1981, 1990) suggest that self-consciousness operates in a similar manner. Once we focus our attention on ourselves, we compare our current state with important goals and values. If the gap between reality and these goals and values is too large, we make adjustments in our behavior to move closer to the desired states. In this sense, self-consciousness is an important component in the self-regulation of our behavior.

Scheier and Carver (1986, 1987) and many other psychologists (e.g., Britt, 1992) also draw a distinction between two forms of self-consciousness: *private self-consciousness* and *public self-consciousness*. Private self-consciousness is our tendency to reflect on private aspects of the self—our own feelings, attitudes, and values. In contrast, public self-consciousness has to do with our tendency to think about aspects of the self that are presented to others—how we appear in others' eyes. When you look into a mirror or at a photograph of yourself, you almost certainly experience public self-consciousness; after all, you are seeing yourself (physically) the way others do. But if seeing your own reflection causes you to think about how you are feeling or about what kind of person you really are, you may experience heightened private self-consciousness too. In fact, in much research on self-awareness, experimenters cause participants to experience this state by having them work on various tasks in front of a mirror or with a camera aimed in their direction. Many different studies offer support for the basic assumptions of the control theory proposed by Carver and Scheier. Thus, this theory seems to be a useful framework for thinking about the nature of self-consciousness and its impact on behavior.

Factors That Produce Heightened Self-Consciousness That mirrors and cameras induce heightened self-consciousness is obvious. Many other factors, however, may cause us to enter this state of consciousness. One of these can best be described as a personal tendency or disposition to become self-conscious. Some persons, in other words, spend more time thinking about themselves—their feelings and reactions, the kind of impression they are making on strangers—than others. Where do you fall on this dimension? To find out, answer the questions in Table 4.2 (on page 146).

These are items from a psychological test designed to measure both private and public self-consciousness (Scheier & Carver, 1986). As you can probably guess, the items in Table 4.2 measure private self-consciousness; people who score high on these items have a greater than average tendency to think about themselves and their inner feelings or reactions (Britt, 1992). Other items on the self-consciousness scale measure public self-consciousness.

Another factor that influences self-consciousness is the familiarity of a given situation. In general, the more familiar and comfortable with a situation people are, the greater their tendency to think about themselves while in it, and so the greater their self-consciousness.

A third factor that strongly influences self-consciousness is our current mood. Research findings indicate that persons experiencing either happy or

Heightened Self-Consciousness

What do you do when you pass a mirror? If you are like most people, you glance at your reflection—experiencing increased awareness of yourself and your appearance.

Self-Consciousness: *Increased awareness of oneself as a social object or of one's own values and attitudes.*

Control Theory of Self-Consciousness: *A theory suggesting that people compare their current behavior and states with important goals and values. They then alter their behavior to close any gaps they observe.*

TABLE 4.2

Private Self-Consciousness

Are you high in private self-consciousness? To find out, add the numbers you entered for items 1, 3, 4, 5, 6, and 8; then subtract the numbers you entered for items 2 and 7. The higher your score, the more you tend to be aware of your own inner feelings and reactions. (*Source:* Based on items from Britt, 1992).

Indicate how characteristic or uncharacteristic of you each of these items is by placing a number in the blank space next to each.

0 = extremely uncharacteristic
1 = uncharacteristic
2 = neither characteristic nor uncharacteristic
3 = characteristic
4 = extremely characteristic

_____ 1. I'm always trying to figure myself out.
_____ 2. Usually, I'm not very aware of myself.
_____ 3. I think about myself a lot.
_____ 4. I'm often the subject of my own fantasies or daydreams.
_____ 5. I usually pay close attention to my inner feelings.
_____ 6. I'm aware of the way my mind works when I try to solve a problem or reason something out.
_____ 7. I never reflect on myself.
_____ 8. I frequently examine my own motives.

CHOKING UNDER PRESSURE

Performing in front of a large crowd can cause many people—even professional athletes—to experience increased self-consciousness. This, in turn, can sometimes interfere with performance.

Choking under Pressure: *The tendency to perform less well at times when pressures for excellent performance are especially high.*

sad moods are more likely to focus their attention inward than are persons in a neutral mood, presumably because they wish to understand their feelings and the factors responsible for them (Salovey, 1992).

THE EFFECTS OF SELF-CONSCIOUSNESS: REDUCED PERFORMANCE BUT INCREASED SELF-INSIGHT That we often experience self-consciousness is obvious: This state is a regular part of daily life. But what are the effects of this inward focus? Research on this topic suggests that they are something of a mixed bag. On the negative side of the ledger is a phenomenon known as **choking under pressure** (Baumeister & Scher, 1988). This term refers to the fact that sometimes people do worse when confronted with strong pressures to perform than on other occasions. For example, athletes who do very well in practice, when pressure is low, may choke up during important games or contests. Growing evidence indicates that heightened self-consciousness may contribute to such effects. The reasoning goes something like this. Many highly skilled activities are performed under automatic control. For example, consider typing. Once you have mastered this skill, you don't think about the keys. If you do, such cognition may actually interfere with your performance and cause you to make errors Similar effects occur with respect to many other skilled actions, from skiing and diving to pitching a baseball and swinging a golf club. When people performing such actions think too much about what they are doing, their performance may suffer. Unfortunately, heightened self-consciousness—such as that induced by a huge audience of cheering fans—leads to precisely this kind of thought. The result: performance suffers. Several studies offer support for this reasoning (e.g., Baumeister & Steinhilber, 1984). So in some cases, at least, it appears that increased self-consciousness can prove costly indeed.

This is not the entire story, however. There are also potential benefits from entering a state of increased self-consciousness. In particular, it appears that

doing so can sometimes increase our *self-insight*. For example, consider research conducted by Hixon and Swann (1993). These researchers asked pairs of friends to rate themselves on several different dimensions (such as intelligence, athletic ability, and social skills). Participants in half of the pairs (those in the *high-self-reflection* condition) performed this task under conditions that allowed them to reflect on their own traits—to experience increased self-consciousness. Participants in the other half (those in the *low-self-reflection* condition) performed the task under conditions that prevented such reflection; they were asked to remember an eight-digit number while they worked. Trying to remember this number, of course, used cognitive resources and interfered with (or at least reduced) self-consciousness. While participants performed these tasks, their friends rated them on the same dimensions. When the two sets of ratings were then compared, it was found that they were more similar in the high-self-reflection condition than in the low-self-reflection condition. In other words, when participants were prevented from experiencing heightened self-consciousness, their accuracy in assessing their own traits was reduced. These findings and those of related studies (e.g., Swann et al., 1992) suggest that increased self-consciousness may sometimes contribute to enhanced self-insight. This is not always the case: other evidence indicates that if we think about ourselves *too much*, we can become confused and may experience reduced rather than increased self-insight (Wilson & Schooner, 1991). But as Hixon and Swann note (1993, p. 4), it appears that self-reflection often may be an essential ingredient in increased self-knowledge.

KEY POINTS

- Automatic processing involves performing activities without conscious attention. In contrast, controlled processing requires conscious attention.
- Daydreams and fantasies are common and may serve several useful functions.
- When we focus our attention on ourselves, we enter a state of self-consciousness.
- Increased self-consciousness can interfere with the performance of skilled activities (choking under pressure). However, self-consciousness can also serve as an important first step toward increased self-insight.

SLEEP: The Pause That Refreshes?

What single activity occupies more of your time than any other? While you may be tempted to say "studying" or "working," think again. If you are like most people, the correct answer is probably **sleep**. A majority of human beings spend fully one-third of their entire lives asleep, and for some the proportion is even higher (Dement, 1975; Webb, 1975). Any activity that occupies so much of our time must be important, so efforts to understand the nature of sleep have continued in psychology for several decades. What has this research revealed? What happens when we sleep and when we dream? And what are the functions of these processes? These are some of the questions we will now explore.

SLEEP: How It Is Studied

Everyone would agree that when we sleep, we are in a different state of consciousness than when we are awake. But what is sleep really like? This is a difficult question to answer, since during sleep we are generally less aware of ourselves and our surroundings than at other times. For this reason, asking people about their own experience with sleep is not a very useful technique for studying it. Fortunately, another, much more informative approach exists. As a person moves from a waking state to deep sleep, complex changes in the electrical activity of the brain occur. These changes can be measured with

***Sleep:** A process in which important physiological changes (including shifts in brain activity and slowing of basic bodily functions) are accompanied by major shifts in consciousness.*

great precision, and the resulting **electroencephalogram (EEG)** reveals much about the nature of sleep. Thus, in much research on this process, volunteers are fitted with electrodes so that researchers can study their EEGs as well as other changes in bodily functions such as respiration, muscle tone, heart rate, and blood pressure. The changes that occur as the volunteers fall asleep and continue sleeping are then recorded. In this way researchers can obtain revealing information about the normal course of sleep as well as about factors affecting it.

Sleep: Its Basic Nature

What has sleep research revealed? Perhaps the best way of answering is by describing the changes in brain activity and other bodily processes that occur during a single night of sleep. As we will soon see, these changes reveal a regular progression through several different stages. In a sense, these are part of our normal circadian rhythms, so it is reasonable to view sleep as an additional portion of this overall pattern.

When you are fully awake and alert, your EEGs contain many *beta waves:* relatively high-frequency (14 to 30 Hz), low-voltage activity. As you enter a quiet, resting state (for example, just after getting into bed and turning out the light), beta waves are replaced by **alpha waves**: EEG activity that is somewhat lower in frequency (8 to 13 Hz) but slightly higher in voltage. As you begin to fall asleep, alpha waves are replaced by even slower, higher-voltage **delta waves**. The appearance of delta waves seems to reflect the fact that increasingly large numbers of neurons are firing together, in a synchronized manner.

Although such phrases as "drifting off to sleep" suggest that the onset of sleep is gradual, it is actually quite sudden. One instant you are awake and aware of your surroundings; the next you are asleep, no longer experiencing such awareness. Sleep is not entirely an either-or type of phenomenon, however. EEG records obtained from thousands of volunteers in sleep research indicate that sleep can actually be divided into four different stages. The transition from wakefulness to sleep occurs with the onset of Stage 1 sleep. During this stage, a mixed but relatively slow, low-voltage EEG pattern emerges. Breathing slows, muscle tone decreases, and the body generally relaxes. At this point, individuals can still be readily awakened by external stimuli. If they are not, they move into Stage 2 (Webb, 1975). During this stage the brain emits occasional short bursts of rapid, high-voltage waves known as sleep spindles. In Stage 2, sleepers are much more difficult to awaken than they were during Stage 1. Stage 2 is followed by Stages 3 and 4. As shown in Figure 4.2, these stages are marked by the increasing appearance of slow, high-voltage delta waves, and by a further slowing of all major bodily functions (Dement, 1975). Almost everyone shows the same pattern of shifts in falling asleep; indeed, departures from this pattern are often a sign of physical or psychological disorders (e.g., Empson, 1984).

So far, the picture I have presented probably sounds consistent with your own subjective experience of sleep; you change from being awake to being more and more deeply asleep. About ninety minutes after the process begins, however, several dramatic changes occur. First, most persons enter a highly distinct phase known as **REM (rapid eye movement) sleep**. During this phase, the electrical activity of the brain changes rapidly; it now closely resembles that shown when people are awake. Delta waves disappear, and fast, low-voltage activity returns. Second, sleepers' eyes begin to move about rapidly beneath their closed eyelids. Third, there is an almost total suppression of activity in body muscles. Indeed, muscle relaxation is so great that a state bordering on paralysis seems to exist. Yet at the same time, males may

Electroencephalogram (EEG): *A record of electrical activity within the brain. EEGs play an important role in the scientific study of sleep.*

Alpha Waves: *Brain waves that occur when individuals are awake but relaxed.*

Delta Waves: *High-amplitude, slow brain waves that occur during several stages of sleep, but especially during Stage 4.*

REM Sleep: *A state of sleep in which brain activity resembling waking restfulness is accompanied by deep muscle relaxation and movements of the eyes. Most dreams occurring during periods of REM sleep.*

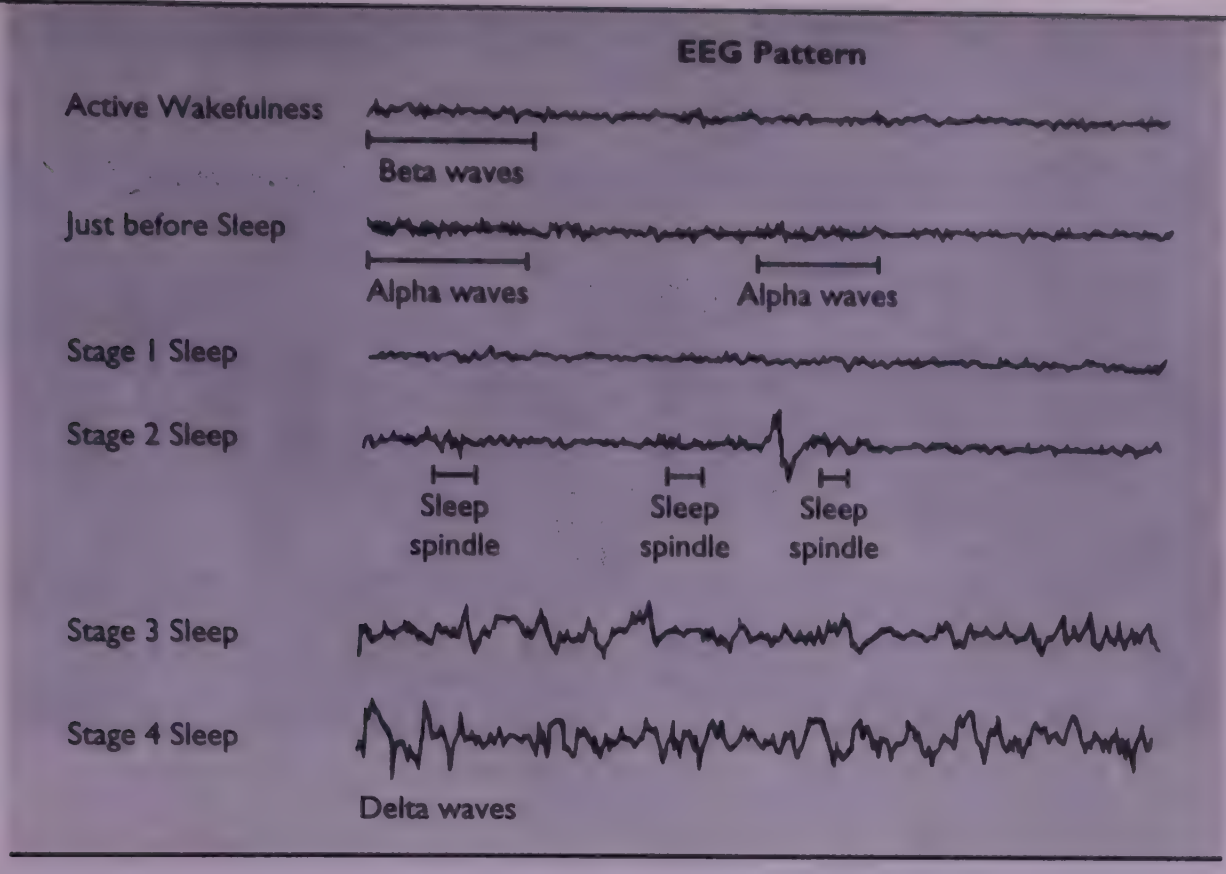


FIGURE 4.2

Sleep Stages

As an individual falls asleep, the electrical activity of her or his brain changes in an orderly manner. Note the contrasting patterns of activity shown before sleep begins and during each of the succeeding stages.

experience erections and females corresponding changes in their sexual organs. This combination of signs of activation along with signs of profound relaxation has led some researchers to describe REM sleep as *paradoxical* in nature, and in several respects this description seems apt.

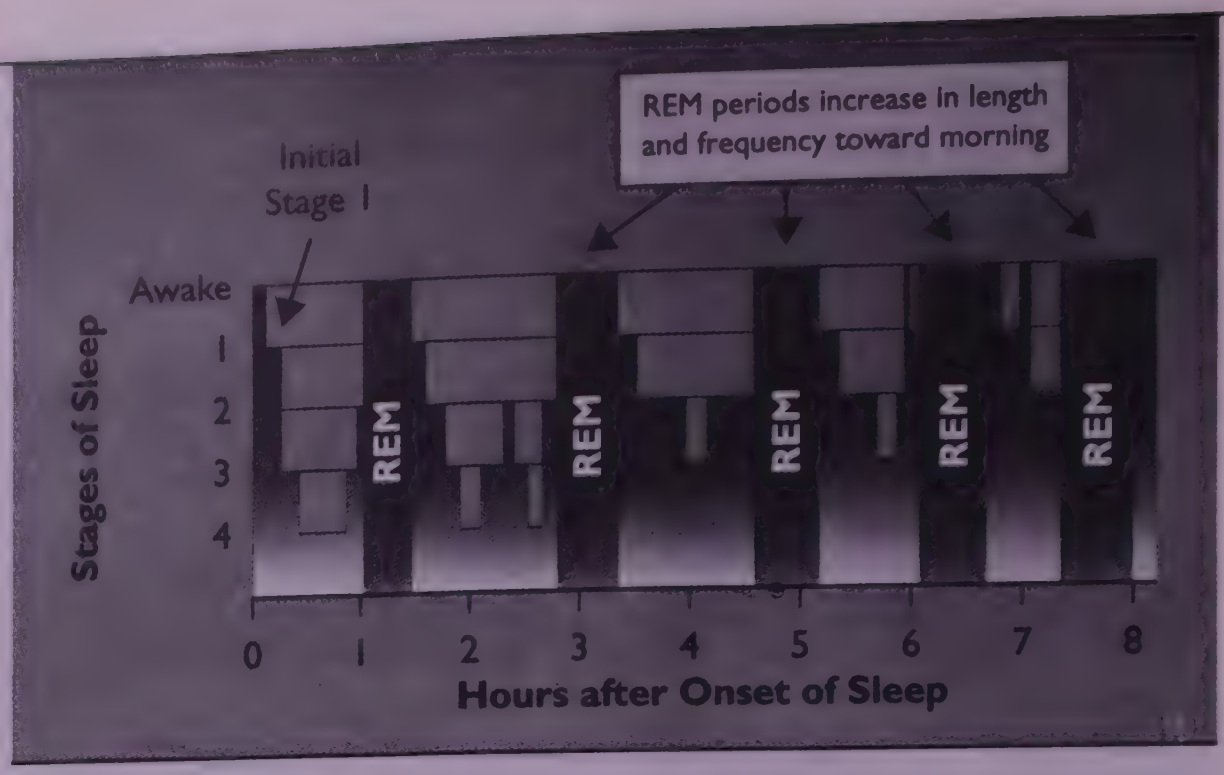
These observable shifts in brain activity and bodily processes are accompanied, in many cases, by one of the most fascinating phenomena of sleep: *dreams*. An individual awakened during REM sleep often reports dreaming. In some cases, eye movements during such sleep seem to be related to the content of dreams (Dement, 1974). It is if the individual is following the action in a dream with his or her eyes. The relationship between rapid eye movements and dream content is uncertain, however, so it is best to view this as an intriguing but as yet unverified possibility.

Periods of REM sleep continue to alternate with the other stages of sleep throughout the night. The duration is variable, but the REM periods tend to increase in length toward morning, while the amount of time spent in Stage 4 tends to decrease (see Figure 4.3 on page 150). Thus, while the first REM period may last only five to ten minutes, the final one—from which many people awake—may last thirty minutes or more (Hartmann, 1973; Kelly, 1981).

SLEEP: What Functions Does It Serve?

Any activity that fills as much of our lives as sleep must serve important functions. But what, precisely, are these? What benefits do we gain from the hours we spend asleep? Several theories exist.

The first, and perhaps most obvious, is the restorative or recuperative theory, which suggests that sleep provides the rest we require to recover from the wear and tear of the day's activities. While this view seems consistent with our subjective impressions (we often report feeling irritable and out of sorts after a poor night's sleep), there is little direct evidence for it. Even prolonged deprivation of sleep does not seem to produce large or clear-cut effects on behavior. For example, in one demonstration seventeen-year-old Randy Gardner stayed awake for 264 hours and 12 minutes—eleven entire days! His motivation for doing so was simple: He wanted to earn a place in



Time Spent in Various Stages of Sleep during a Single Night

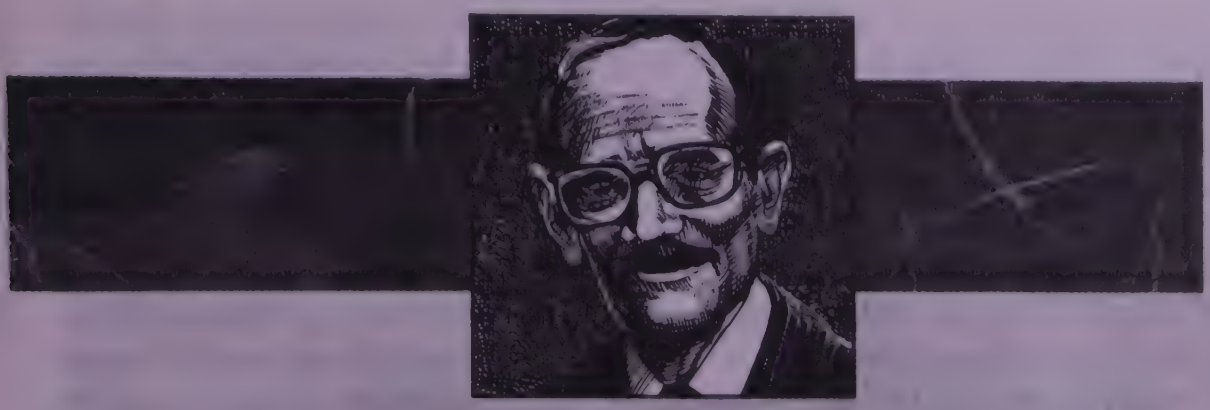
Periods of REM sleep alternate with other stages of sleep during the night. The duration of the REM periods tends to increase toward morning, while the amount of time spent in Stage 4 decreases.

the *Guinness Book of Records*, and he did. Although he had some difficulty staying awake this long, he remained generally alert and active throughout the entire period. After completing his ordeal, Randy slept a mere 14 hours. Then he returned to his usual 8-hour cycle. Further, he seemed to suffer no lasting physical or psychological harm from his long sleepless period.

More systematic studies of the effects of sleep deprivation have been conducted with both animals and people (e.g., Rechtschaffen et al., 1983). With respect to humans, several long-term studies have been performed in which volunteers gradually reduce their nightly sleep (for example, by thirty minutes every two or three weeks). These procedures continue until the volunteers report that they do not want to reduce their sleep any further. Results indicate that most people can reduce their amount of sleep to about five hours per night (Mullaney et al., 1977). No reductions in their performance on various tasks, no negative shifts in mood, and no harmful effects on health seem to result from such reductions. The major changes observed involve sleep itself. After reducing their sleep to five hours or less, participants demonstrate what has been described as increased *sleep efficiency*. They fall asleep very quickly, and they spend a higher proportion of time in Stage 4 sleep. It is as if they have learned to compress their sleep into a shorter period of time. In sum, research on sleep deprivation does not offer strong support for the view that sleep serves primarily a restorative or recuperative function.

A second theory on the function of sleep emphasizes the relationship of sleep to basic circadian rhythms. According to this view, sleep is merely the neural mechanism that evolved to encourage various species, including human beings, to remain inactive during those times of day when they do not usually engage in activities related to their survival. As one well-known sleep researcher (Webb, 1975) has put it, sleep is nature's way of keeping us quiet at night—a dangerous time for our ancestors and, given crime statistics, for us, too.

Yet another possibility is that only certain components of sleep are crucial. For example, it has been suggested that perhaps it is REM sleep that is essential to our health and well-being, and that being deprived of such sleep will induce harmful effects. Unfortunately, efforts to test this possibility have yielded mixed results. On the one hand, a few studies have indicated that selectively depriving individuals of REM sleep (by waking them whenever



Wilse B. Webb

Known for his research on the nature of sleep, Webb's current research includes analyzing the effects of aging, species, time schedules, and individual differences on sleep, and studying the effects of variations in sleep on performance. His advice to students: ". . . the panorama of psychology is broad enough to contain the best of science and, today, the best of 'serving' so how could you miss doing your best . . . [?]"

their EEGs indicate that they have entered this phase) may interfere with their ability to retain newly learned information (McGrath & Cohen, 1978). These findings suggest that REM sleep may play an important role in the integration of newly acquired information with existing memories and knowledge. On the other hand, some studies indicate that the only effect of depriving individuals of REM sleep is to increase the amount of such sleep they have on subsequent nights (Webb & Agnew, 1967).

So where does all this leave us? Does sleep really serve important functions? Or is it merely a holdover from our more primitive past, like male facial hair or the appendix? Most sleep researchers reject this conclusion. They believe that sleep probably serves both the restorative and the circadian functions noted above (Borbely et al., 1989). In support of this reasoning, some findings suggest that the amount of time people spend in slow-wave sleep is related to how long they have been awake, while the amount of time they spend in REM sleep is related mainly to circadian rhythms—the daily cycles of activity and rest (Webb, 1975). Further, there is an important relationship between sleep and waking moods. The more effectively people sleep, the more positive are their waking moods, and the less anxiety they experience (Berry & Webb, 1985). So, in sum, sleep does seem to serve important functions for us. Falling asleep is a function of both restorative and circadian factors, and sleep itself fulfills needs related to both.

Key Points

- The EEG is an important method for studying sleep.
- As we sleep, we pass through several different stages, in which patterns of brain activity change and our awareness of the external world decreases.
- During REM sleep, the EEG shows a pattern very similar to that of waking, but there is almost total suppression of activity in body muscles. Most dreams occur during REM sleep.
- Although most people report feeling tired and irritable, they can still function well even after prolonged periods of sleep deprivation.
- Growing evidence indicates that sleep does serve important functions relating to restoration of bodily resources and circadian rhythms.

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Sleep Disorders: No Rest for the Weary

Do you ever have trouble falling or staying asleep? If so, you are in good company: Almost 40 percent of adults report that they sometimes have this problem—generally known as **insomnia** (Bixler et al., 1979). Further, such problems seem to increase with age and are somewhat more common among women than men. While many people report insomnia, it is not clear that the problem actually exists in all cases. When the sleep habits of people who claim to be suffering from insomnia are carefully studied, it turns out that many of them sleep as long as people who do not complain of such problems (Empson, 1984). As pointed out by Trinder (1988), this does not necessarily imply that such persons are faking their disorder or complaining about a problem they don't really have. For example, while the amount of sleep they obtain is within what experts consider to be normal limits (6.5 hours or more per night), this may still not be enough to meet their individual needs. Further, the quality of their sleep may be disturbed in ways not yet measured in research. Still, such arguments aside, it does appear that many people who believe that their sleep is somehow inadequate may actually be getting as much sleep, and sleeping about as well, as others who don't report such problems.

Unfortunately, no totally effective cure for insomnia exists. However, you may well find the following tactics helpful:

1. Read something pleasant or relaxing just before going to sleep.
2. Arrange your schedule so you go to sleep at the same time each night.
3. Take a warm bath, massage, or other relaxing treatment at bedtime.
4. If you find yourself tossing and turning, get up and read, work, or watch television until you feel drowsy. Lying in bed for hours worrying about loss of sleep is definitely *not* the answer.
5. Don't worry. Almost everyone experiences difficulty falling asleep sometimes, so don't be overly concerned unless the problem persists for more than a few days.

By the way, despite the promises of advertisements, sleeping pills—prescription as well as nonprescription—are *not* an effective sleep aid. They may induce sleep at first, but tolerance to them quickly develops so that larger and larger doses are soon needed. Further, some drugs used for this purpose interfere with REM sleep, and this can lead to other sleep disturbances.

Unfortunately, insomnia is far from the only problem associated with sleep. Several other *disorders of initiating and maintaining sleep* (DIMS for short) exist. First, there are disorders of arousal. The most dramatic of these is **somnambulism**—walking in one's sleep. This is less rare than you might guess; almost 25 percent of children experience at least one sleepwalking episode (Empson, 1984). A second, related disorder is **night terrors**: Individuals, especially children, awaken from deep sleep with signs of intense arousal—such as a racing pulse and rapid respiration—and powerful feelings of fear. Yet they have no memory of any dream relating to these feelings. Night terrors seem to occur primarily during Stage 4 sleep. In contrast, *nightmares*, which most of us have experienced at some point, occur during REM sleep and often can be vividly recalled. Both somnambulism and night terrors appear to be related to disturbances in the functioning of the autonomic nervous system, which plays a key role in regulating brain activity during sleep.

Another, especially disturbing, type of sleep disorder is **apnea**. Persons suffering from sleep apnea actually stop breathing when they are asleep. Needless to say, this causes them to wake up. Since this process can be repeated literally hundreds of times during the night, apnea can seriously affect the health of persons suffering from it.

Insomnia: *Disorder involving the inability to fall asleep or remain asleep.*

Somnambulism: *A sleep disorder in which individuals actually get up and move about while still asleep.*

Night Terrors: *Extremely frightening dreamlike experiences that occur during non-REM sleep.*

Apnea: *Cessation of breathing during sleep.*

Have you ever felt yourself twitch suddenly as you were sleeping or while falling asleep? If so, you have had a small taste of what people suffering from another sleep disorder—*nocturnal myoclonus*—experience. Such persons endure periodic and repeated episodes of body twitching all through the night. Little wonder that their sleep is greatly disturbed.

Finally, there are several disorders known as **hypersomnias**, in which affected persons appear to sleep too much. The most serious of these is **narcolepsy**, a condition in which individuals suddenly fall deeply asleep in the midst of waking activities. Such attacks are sometimes accompanied by almost total paralysis and are often triggered by a strong emotion. Thus, when a person with narcolepsy becomes excited or upset, he or she may suddenly fall down in a deep sleep. I once had a colleague who suffered from this problem. During a lecture he would sit down, lean forward, and suddenly be asleep—often in the middle of a sentence. Students in his classes found this disturbing, to say the least.

What causes such sleep disorders? For some persons, insomnia seems to involve disturbances in the internal mechanisms that regulate body temperature. As noted in our discussion of circadian rhythms, core body temperature usually drops to low levels during sleep. This conserves energy and permits many bodily functions to proceed at reduced rates. In persons suffering from insomnia, however, these mechanisms fail to operate normally, with the result that the body temperatures of insomniacs remain relatively high (Sewitch, 1987).

Other causes of sleep disorders may involve disturbances of the biological clock within the hypothalamus (the suprachiasmatic nucleus). This clock interacts with other structures of the brain—such as serotonin-producing portions of the reticular activating system and parts of the forebrain just in front of the hypothalamus—to regulate all circadian rhythms, including the sleep-waking cycle. Any disturbance in these complex and delicately balanced mechanisms, then, can result in sleep disorders.

DREAMS: Stimulation in the Midst of Sleep

Without a doubt, the most dramatic aspect of sleep is **dreams**—jumbled, vivid, sometimes enticing and sometimes disturbing images that fill our sleeping minds. What are these experiences? Why do they occur? Psychologists are still seeking final answers to these puzzling questions, but we already know much more about dreams than was true only a few decades ago. Here, we'll first consider some basic facts about dreams, then turn to three contrasting views concerning their nature and function.

DREAMS: SOME BASIC FACTS Try answering each of the following questions. Then consider the answers given—which reflect current knowledge about the nature of these encounters with the workings of our own nervous systems.

1. *Does everybody dream?* The answer seems to be yes. While not all people remember dreaming, EEG recordings and related data indicate that everyone experiences REM sleep. Moreover, if awakened during such periods, even people who normally don't recall dreaming may report vivid dreams.
2. *How long do dreams last?* Many people believe that dreams last only an instant, no matter how long they may seem. In fact, though, dreams seem to run on "real time": The longer they seem to last, the longer they really are (Dement & Kleitman, 1957).

Hypersomnias: *Disorders involving excessive amounts of sleep or an overwhelming urge to fall asleep.*

Narcolepsy: *A sleep disorder in which individuals are overcome by uncontrollable periods of sleep during waking hours.*

Dreams: *Cognitive events, often vivid but disconnected, that occur during sleep. Most dreams take place during REM sleep.*

"Dream of Ossian" by Jean Ingres

Artists throughout history have attempted to capture the essence of dreams in their work.

3. *Can external events be incorporated into dreams?* Common sense suggests that they can, and this idea seems to be correct, at least to a degree: External events are sometimes incorporated into dreams. For example, Dement and Wolpert (1958) sprayed water on sleeping people who were experiencing REM sleep. Then they woke them up. In more than half the cases, participants reported water in their dreams.
4. *If a man experiences an erection or a woman experiences vaginal secretions during sleep, does this mean that the sleeper is having a sexy dream?* The answer to this one seems to be no. When male and female volunteers are awakened at such times, they are no more likely to report dreams with sexual content than they would be at other times (Karacan et al., 1966). So signs of sexual arousal during dreams seem to be a mere by-product of other bodily events occurring during dreaming.
5. *Do dreams really express unconscious wishes?* Many people believe that they do, but there is no convincing evidence for this view. Please see the discussion of this topic below.
6. *When people cannot remember their dreams, does this mean that they are purposely forgetting them, perhaps because they find the content of their dreams too disturbing?* Probably not. Research on why people can or cannot remember their dreams indicates that this is primarily a function of what they do when they wake up; for instance, whether they lie quietly in bed, actively trying to remember the dream, or leap up and start the day's activities. While we can't totally rule out the possibility of some kind of repression—that is, of active, motivated forgetting—there is little evidence for its occurrence.

Now that we've considered some basic facts about dreams, let's turn to several views concerning their nature and function.

Dreams: The Psychodynamic View Perhaps the most dramatic answers to the questions posed at the start of this section are those proposed by Sigmund Freud. He felt that dreams provide an important means of probing the unconscious—all those thoughts, impulses, and wishes that lie outside the realm of conscious experience. In dreams, he believed, we can give expression to impulses and desires we find unacceptable during our waking hours. Thus, we can dream about gratifying illicit sexual desires or about inflicting painful tortures on persons who have made us angry, although we actively repress such thoughts during the day.

Freud contended that no matter how vague, jumbled, or strange dreams may seem to be, they always contain important messages. Often these are disguised, either in the dreams themselves or in our memories of them. But if we search diligently enough, we will be able to uncover them. Freud incorporated detailed analysis of dreams into his treatment of patients suffering from a wide range of psychological problems. He claimed that this often provided him with just the insight he needed to understand and help them. His reports of such interpretations make provocative reading—but, alas, there is virtually no scientific evidence for their accuracy, or for Freud's more general assertions about dreams. He left us with no clear-cut rules for interpreting dreams and no way of knowing whether such interpretations are accurate. Further, as we'll note in the **Perspectives on Diversity** section below, dreams, and their meanings, may be strongly influenced by cultural factors; dreams differ greatly not only from one person to another, but from culture to culture. In view of these facts, few psychologists are currently willing to accept the view that dreams offer a unique means for exploring the unconscious. Instead, most accept one of the alternative views we will now consider.

Perspectives on Diversity

Culture and the Interpretation of Dreams

As mentioned earlier, Freud believed that dreams contain important messages from the *unconscious*—that they reflect impulses and thoughts that are hidden from our view while we are awake. More specifically, he contended that the **manifest content** of a dream—what we actually remember about it— may not, at first glance, reveal its **latent content**—the underlying, hidden meaning. How can the latent content of dreams be determined? Freud's answer: through careful application of his theories!

For example, consider Freud's interpretation of dreams that were reported to him by several of his male patients. In these dreams the patients' fathers were somehow harmed, much to the patients' grief and horror. In fact, when describing such dreams, some patients would lose control and burst into tears. How did Freud interpret these dreams? In his view, dreams serve a wish-fulfilling function, allowing people to express desires they cannot express while awake. Within this framework, dreams in which male patients' fathers are harmed represent unconscious anger or resentment toward their parents. According to Freud, these feelings, in turn, stem from what he termed the Oedipus complex—the male's jealousy about his father's sexual relationship with his mother.

Manifest Content: *In Freud's theory, the overt or reported content of dreams.*

Latent Content: *In Freud's theory, the hidden content of dreams.*

CULTURE AND DREAMS

If dreams represent universal human themes, as Freud asserted, then they should be similar in all cultures. Research with the Trobriand culture in New Guinea has shown that they are not.

These are certainly provocative suggestions, but are they actually correct? One way to find out would be to determine whether males in cultures other than the one in which Freud worked (nineteenth-century Vienna) also report such dreams. If they do, then support could be obtained for the view that the Oedipus complex is universal, and for Freud's interpretation of such dreams.

Such research has been conducted, and in general it has failed to confirm the universality of "Oedipus complex" dreams. For example, in one famous study, Malinowksi (1927) found that boys in the Trobriand culture of New Guinea often reported dreams in which their maternal uncles (their mothers' brothers), not their fathers, were hurt. Why did they have such dreams? Their uncles certainly didn't have sexual relationships with their mothers, so what was the root of the hidden resentment toward their uncles expressed in these dreams? One possibility is suggested by the fact that in Trobriand culture, maternal uncles, not fathers, are the ones who train and discipline boys. So it seems possible that the dreams reported by Trobriand boys reflect resentment toward the adult males who discipline them. This interpretation is strengthened by the facts that Trobriand boys do *not* have such dreams about their fathers, while none of Freud's Viennese patients have such dreams about their uncles. Put in other terms, in Viennese culture, the two roles "mother's lover" and "source of discipline" are filled by a single person: boys' fathers. In Trobriand culture, in contrast, these two roles are filled by different persons: boys' fathers and maternal uncles. Comparing the two cultures permits us to determine which of these roles is related to a specific kind of dream (Segall et al., 1990).

In sum, the findings of cross-cultural research indicate that Freud may well have been correct in suggesting that dreams can sometimes function as an outlet for expressing unacceptable impulses, but that he was wrong in suggesting that dreams' content is universal across all cultures. Rather, it appears that the content of dreams—and their specific meaning—is strongly influenced by the dreamer's culture. Further, comparing dreams in different cultures can help us to understand the dreams' meaning and the impact of cultural factors on them. Even at this very basic level, therefore, adopting a multicultural perspective is valuable and informative.

DREAMS: THE PHYSIOLOGICAL VIEW If dreams aren't reflections of hidden wishes or impulses, what are they? Another answer is provided by what is sometimes known as the *physiological view* of dreams. According to this perspective (Hobson, 1988; McCarley & Hobson, 1981), dreams are simply our subjective experience of what is, in essence, random neural activity in the brain. Such activity may reflect ongoing information-processing tasks, as described below, or may occur simply because a minimal amount of stimulation is necessary for the normal functioning of the brain and nervous system. In other words, dreams merely represent efforts by our cognitive systems to make sense out of this neural activity (Foulkes, 1985; Hobson, 1988). As Hobson has put it, the brain "is so . . . bent on the quest for meaning that it attributes and even creates meaning when there is little or none to be found in the data it is asked to process."

DREAMS: THE COGNITIVE VIEW A third view carries somewhat further these suggestions concerning our cognitive systems' efforts to interpret neural activity during sleep. This perspective, proposed by Antrobus (1991), suggests that two facts about REM sleep are crucial to understanding the nature of dreams: (1) During REM sleep areas of the brain in the cerebral

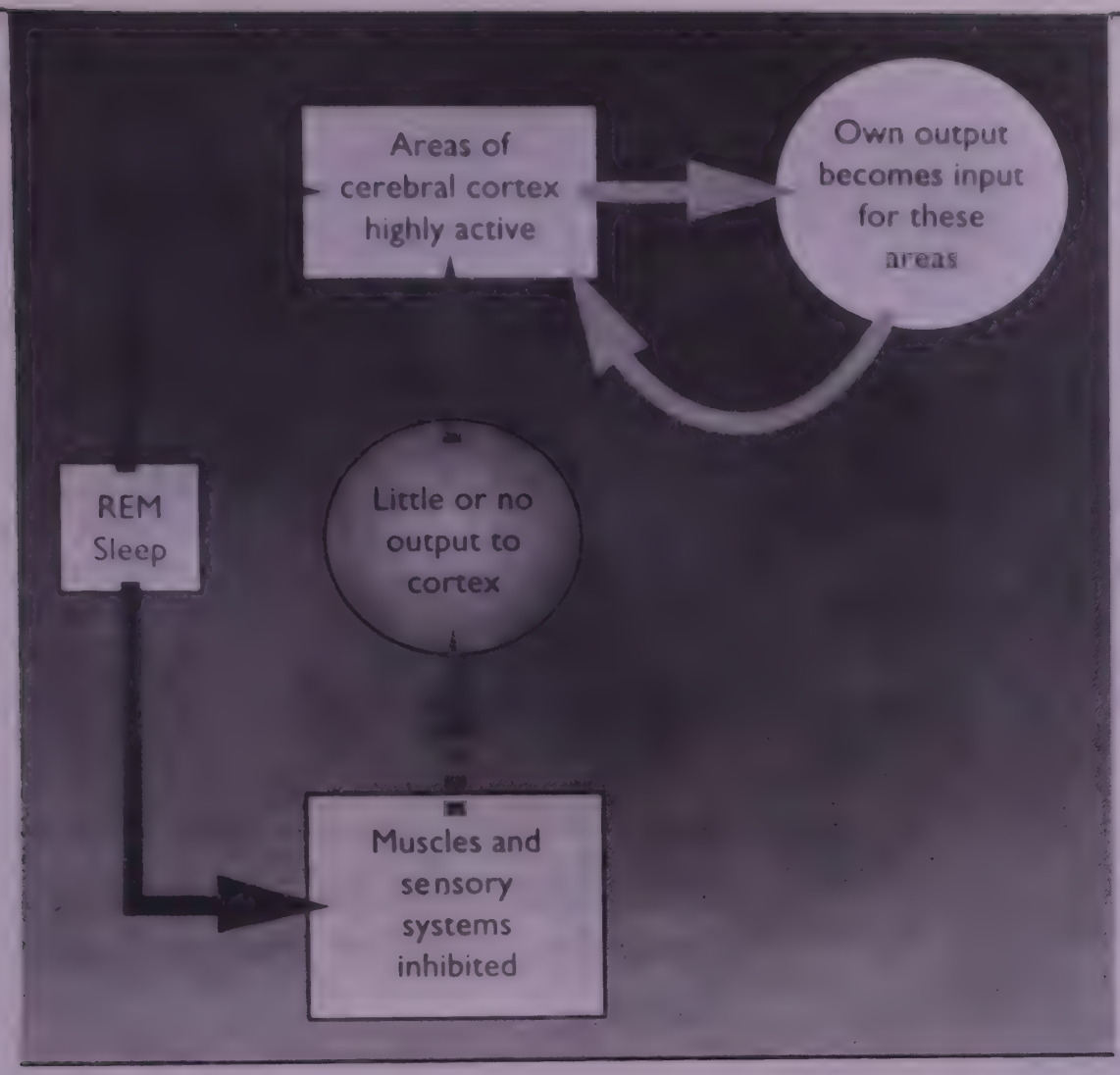


FIGURE 4.4

Dreams: One Modern View

According to a model proposed by Antrobus (1991), dreams occur because during REM sleep, areas of the brain that play a key role in waking perception and thought are highly active while at the same time there is massive inhibition of input from sensory systems and muscles. As a result, the cortical systems that normally regulate perception and thought have only their own output as input. The interpretation of this activity forms the basis for dreams.
(*Source:* Based on suggestions by Antrobus, 1991.)

cortex that play a key role in waking perception, thought, and regulation of motor processes are highly active; (2) yet, at the same time, there is massive inhibition of input from sensory systems and muscles (which, as you may recall, are suppressed during REM sleep). As a result, Antrobus (1991) reasons, the cortical structures or systems that normally regulate perception and thought have only their own output as input. The result is that this activity forms the basis for the imagery and ideas in dreams (see Figure 4.4).

Does this mean that dreams are meaningless? Not at all. Since they represent interpretations of neural activity by our own brains, they reflect aspects of our memories and waking experience. Convincing evidence for this connection between dreams and important events in our lives is provided by the fact that people attempting to make important changes in their own behavior—for example, to quit smoking or drinking—often report having **dreams of absent-minded transgression**—DAMIT dreams for short (e.g., Gill, 1985). In such dreams, people suddenly notice that they are smoking or drinking, and that they have slipped into this behavior in an absent-minded or careless manner—without planning to do so. This realization leads to feelings of panic or guilt in the dream. In many cases, the dreamers awake at that point, feeling very disturbed.

A study conducted by Hajek and Belcher (1991) yielded intriguing data on the nature of such dreams and their relationship to waking behavior. These researchers asked several hundred persons enrolled in a stop-smoking program to report on the kind of dreams they had before and during the program. They found that about 33 percent of the participants reported having DAMIT dreams while trying to quit, and that they had not had such dreams in the past, while still smoking. Further, and of even greater impor-

Dreams of Absent-Minded Transgression: *Dreams in which persons attempting to change their own behavior, as in quitting smoking, see themselves unintentionally slipping into the unwanted behavior.*

tance, it was found that having such dreams was positively related to participants' success at quitting smoking. A higher proportion of those who reported such dreams were still not smoking one year after the training program.

Why was the occurrence of DAMIT dreams related to success in efforts to refrain from smoking? Hajek and Belcher (1991) suggest that the guilt and panic produced by such dreams are so unpleasant that they help strengthen smokers' resolve to break their habit. The fact that smoking in these dreams is *not* accompanied by the pleasurable feelings of smoking helps to strengthen such effects. To the extent this interpretation is correct, it suggests not only a clear link between what is happening in people's lives at the moment and the contents of their dreams, but a link between the content of dreams and subsequent behavior. In this sense, the content of dreams does have meaning; and, what's more, such meaning may have strong effects on dreamers' overt behavior.

KEY POINTS

- Several kinds of sleep disorders exist. Insomnia is difficulty in falling asleep; somnambulism is sleepwalking; narcolepsy is a tendency to fall suddenly into a deep sleep.
- Dreams occur primarily during REM sleep. Everyone dreams, but not all dreams are remembered.
- Several explanations for the occurrence of dreams have been offered. Freud believed that dreams reflect suppressed thoughts, impulses, and wishes.
- A physiological view suggests that dreams reflect the brain's interpretation of random neural activity during sleep.
- According to a cognitive view, dreams result because many systems of the brain are active during sleep while input from muscles and sensory systems is inhibited.
- Cross-cultural research indicates that the dreamer's culture strongly influences dreams' content and meaning.

Hypnosis: Altered State of Consciousness or Social Role Playing?

At one time in the past, every traveling fair and circus included at least one hypnotist among its performers. The hypnotist would ask for volunteers from the audience and then, before the eyes of hundreds of onlookers, would put these people in what seemed to be a deep trance. Once they were hypnotized, the volunteers would be made to do an assortment of amazing—and sometimes embarrassing—things. They might be told to imagine that they were someone else, or even an animal. Under the hypnotist's commands they would then act this part. Or, having been told that a glass of ammonia contained delightful perfume, they would proceed to sniff it with apparent delight. Sometimes they would be given instructions to perform strange actions after they were awakened from their trance, whenever the hypnotist said a particular word or clapped his hands. Later, the volunteers would obey these previously issued commands, even though they claimed they could not remember the hypnotist's instructions.

Are such seemingly amazing feats actually possible? In other words, is **hypnosis** real? And if so, what is it, and how does it work?

Hypnosis: *An interaction between two persons in which one (the hypnotist) induces changes in the behavior, feelings, or cognitions of the other (the subject) through suggestions. Hypnosis involves subjects' expectations and their attempts to conform to the role of the hypnotized person.*

Hypnosis: What It Is and Who Is Susceptible to It

Let's start with two basic questions: (1) How is hypnotism performed? (2) Is everyone susceptible to it? With respect to the first, standard hypnotic inductions usually involve *suggestions* by the hypnotist that the person being hypnotized feels relaxed, is getting sleepy, and is unable to keep his or her eyes open. Speaking continuously in a calm voice, the hypnotist suggests to the subject that she or he is gradually sinking deeper and deeper into a relaxed state—not sleep, but a state in which the person will not be able to do, think,

HYPNOSIS: HOW IT'S DONE

Psychologists interested in studying hypnosis have developed highly standardized methods for hypnotizing susceptible research participants.

or say anything without input from the hypnotist. Another technique involves having a person concentrate on a small object, often one that sparkles and can be rotated by the hypnotist. Hypnosis is definitely not sleep, by the way. EEG recordings of a hypnotized person resemble those of normal waking, not any of the sleep stages described earlier (Wallace & Fisher, 1987).

Now for the second question: Can anyone be hypnotized? The answer seems clear: Large individual differences in hypnotizability exist. About 15 percent of adults are highly susceptible (as measured by their response to a graded series of suggestions by the hypnotist); 10 percent are highly resistant; the rest are somewhere in between. In addition, it appears that several traits are related to hypnotic susceptibility (Lynn & Rhue, 1986; Silva & Kirsch, 1992). Specifically, persons who are susceptible to hypnotism tend to:

- Have vivid, frequent fantasies
- Be high in visual imagery
- Be high in the trait of absorption—the tendency to become deeply involved in sensory and imaginative experiences
- Be dependent on others and seek direction from them
- Believe that hypnotic suggestions will have a powerful effect on them

The greater the extent to which individuals possess these characteristics, the greater, in general, is their susceptibility to hypnosis. And recent evidence suggests that this is the case because such persons, to a greater extent than others, readily imagine the effects suggested by the hypnotist and so tend to translate them into overt behavior (Silva & Kirsch, 1992). In contrast, there is little evidence that hypnosis-susceptible people intentionally set out to obey these suggestions in a purely voluntary manner.

HYPNOSIS: Contrasting Views about Its Nature

Now let's consider a more complex question: What does hypnosis involve? In other words, what changes—if any—does it produce in consciousness and other psychological processes? Systematic research has led to the formulation of two major theories of the nature of hypnosis.

The Social-Cognitive or Role-Playing View The first of these views suggests that the seemingly strange and mysterious effects of hypnosis can best be understood by reference to the relationship between hypnotized persons and the hypnotist. Specifically, this theory argues that hypnotized persons are actually playing a special *social role*—that of *hypnotic subject*. Having seen movies and read stories about hypnosis, most people have a clear idea of what it supposedly involves. They believe that when hypnotized they will lose control over their own behavior and will be unable to resist strong suggestions from the hypnotist. When exposed to hypnotic inductions (instructions to behave in a certain way or to experience specific feelings), therefore, many people tend to obey, since this is what the social role they are enacting suggests *should* happen. Further, they often report experiencing the changes in perceptions and feelings that they *expect* to experience (e.g., Lynn, Rhue, & Weekes, 1990; Spanos, 1991).

It's important to note that this does not mean that persons undergoing hypnosis engage in conscious efforts to fool others. On the contrary, they sincerely believe that they are experiencing an altered state of consciousness and that they have no choice but to act and feel as the hypnotist suggests. Thus, in an important sense, their behavior and their reports of their experiences while hypnotized are genuine (Kinnunen, Zamansky, & Block, 1994). These behaviors and experiences, however, reflect beliefs about hypnosis and the role of hypnotic subject as much as—or perhaps even more than—the special skills of the hypnotist or the effects of hypnosis on consciousness.

The Neodissociation Theory The second major theory of hypnosis is very different. The **neodissociation theory** suggests that hypnosis operates by inducing two kinds of splits or *dissociations* in consciousness (Bowers, 1990; Hilgard, 1977). The first of these, *dissociated experience*, involves the erection by hypnosis of an amnesia-like barrier that prevents experiences during hypnosis from entering normal consciousness. The second split, known as *dissociated control*, implies a split in normal control over behavior. Persons who have been hypnotized, the theory argues, obey suggestions from the hypnotist in a direct, uncritical fashion; the higher centers of control or *will* are essentially cut out of the picture. According to Hilgard (1977), then, persons who have been hypnotized are in an altered state of consciousness in which one part of their mind accepts suggestions from the hypnotist, while the other part (which Hilgard terms "the hidden observer") observes the procedures without participating in them. So, for example, if hypnotized persons are told to put their arms into icy water but told that they will experience no pain, they will obey and will report no discomfort. However, if asked to describe their feelings in writing, they may indicate that they did experience feelings of intense cold (Hilgard, 1979). So it seems as if one part of consciousness obeys hypnotic suggestions while another does not.

Key Points

- Hypnosis involves a condition in which individuals are highly susceptible to suggestions from others.
- One theory of hypnosis, the social-cognitive view, suggests that the effects of hypnosis stem from the hypnotized person's expectations and efforts to play the role of hypnotized subject.
- Another view, the neodissociation theory, suggests that hypnotism involves splits in consciousness.

Neodissociation Theory: *A theory of hypnosis suggesting that hypnotized individuals enter an altered state of consciousness in which consciousness is divided.*

Which of these theories is correct? While support for both views exists (e.g., Miller & Bowers, 1993), most psychologists believe that the social-cognitive view is more accurate. It appears that most of the unusual or bizarre effects observed under hypnosis can readily be explained in terms of hypnotized persons' belief in the effects of hypnotism and their efforts—not necessarily conscious—to behave in accordance with their expectations and the hypnotist's suggestions. What kind of research findings point to these conclusions? For information, see the following **Research Process** section.

Hypnosis: Does It Produce Actual Changes in Memory and Perception?

Hypnosis often yields dramatic effects. People who have been hypnotized cannot remember what they did or said a few minutes earlier or sometimes remember events that never took place; while hypnotized they report that they cannot see or hear stimuli presented to them. Are such effects real? In other words, do hypnotized persons really experience distortions in memory and in sensory experiences? Or do they merely *report* such effects? Let's see how psychologists have attempted to study this question.

Hypnosis and Memory: Can Hypnotized People Tell Fact from Fiction?

First, consider research on the effects of hypnosis on memory. This is an important topic, for as we'll see in chapter 6, many people accept the view that hypnosis can augment the memories of eyewitnesses to crimes (e.g., Bothwell, 1989; Loftus, 1993). While it is possible that hypnosis helps memory, it is also possible that the "extra" events and details recalled by eyewitnesses under hypnosis reflect *distortions in memory* rather than improved recall. Hypnotized persons may simply remember what the hypnotist's questions *suggest* that they *should* remember. Can hypnotized persons distinguish between such hypnotist-induced errors and what they really saw or heard? If so, then support for the social-cognitive view of hypnosis would be obtained.

In fact, growing evidence indicates that hypnotized persons can make such distinctions. For example, in a recent study on this question, Murrey, Cross, and Whipple (1992) had college students known to be susceptible to hypnosis watch a videotape of a mock robbery and then, under hypnosis, listen to an audiotape containing false and misleading suggestions about the robbery. Later, they asked the students to recall information about the robbery; at this time, some students were offered a monetary reward for being accurate while others were not. If hypnotism produced actual distortions in memory, then the reward should have made no difference: Hypnotized persons would make errors consistent with the false suggestions they heard regardless of whether they were promised a reward for being accurate. If hypnotism merely affected what individuals report, however, then those promised a reward should make fewer errors. This is precisely what was found, so it appears that hypnosis did not produce changes in memory.

Hypnosis and Sensory Hallucinations: The Case of Hypnotic Deafness

What about changes in perception? Under hypnosis, some persons show, and later report, little or no reaction to very painful stimuli (such as placing their arms in icy water; Spanos et al., 1990). Similarly, some persons report that when hypnotized they did not perceive stimuli that were actually presented to them, or that they perceived stimuli that were not really present (Miller & Bowers, 1993; Spanos, 1991). Are such effects real, or do they merely represent efforts by hypnotized persons to behave as they think the hypnotist wants them to behave? Spanos and his associates have devised an ingenious method for studying this issue (e.g., Spanos et al., 1992).

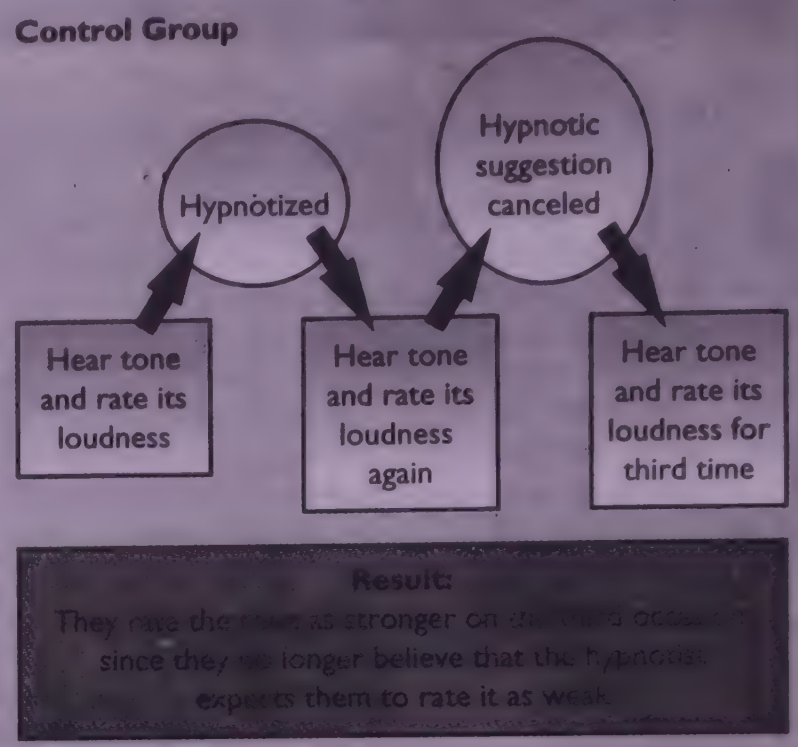
In this approach, participants are exposed to a stimulus they can readily perceive (for example, a tone) on three occasions. The first trial is used to establish a baseline, and after hearing the tone participants rate its loudness. Before the second trial, the participants are hypnotized and given the suggestion that they will not be able to hear the tone; then it is presented once again, and they rate its loudness. Before the third and final presentation of the tone, the hypnotic suggestion is canceled: Participants are told that they will be able to hear the tone. Then it is presented, and they rate it once more. Now comes the crucial part of the procedure: Before rating the tone for the last time, one group of participants (the *demand instruction* group) is informed that they have probably slipped back into hypnosis; thus, they won't be able to hear the tone very well. In contrast, those in another group (*control*) simply rate the tone once more in the absence of this suggestion. Spanos and his colleagues reason that to the extent alterations in perception reported by hypnotized persons stem from their efforts to meet the hypnotist's expectations, then those in the demand instruction group should rate the tone as weaker on both the second and third trials because on both occasions they believe that this is what the hypnotist expects. In contrast, those in the control condition should rate the tone stronger on the third trial, because at this point they have no reason to believe that the hypnotist expects them to experience reduced ability to hear it (see Figure 4.5 on page 162). In several recent studies conducted with persons known to be susceptible to hypnotism (e.g., Spanos et al., 1992), this is precisely the pattern of findings obtained. Based on these results, Spanos has concluded that the changes in perception reported by hypnotized persons represent shifts in what they *report* experiencing, not real changes in what they actually *do* experience—that is, in their perceptual processing.

In sum, existing evidence seems to offer support for the conclusion that the effects of hypnosis stem primarily from efforts (perhaps unconscious ones) by hypnotized persons to meet the hypnotist's expecta-

FIGURE 4.5

Procedures for Determining Whether Hypnotically Induced Deafness Is Real

Persons who are hypnotized and told that they will not be able to hear a tone do rate it as lower in loudness than persons who are not given this hypnotic suggestion.
(*Source*: Based on procedures used by Spanos et al., 1992.)



tions, plus their beliefs concerning hypnotism's powerful impact. This does not imply that all the effects attributed to hypnotism are due to calculated faking. On the contrary, recent findings indicate that most persons attempt to be truthful in describing their experiences when hypnotized (Kinnunen, Zamansky, & Block, 1994): They honestly believe they experienced the effects they report. So, what the findings described here suggest is that hypnotism is better understood in terms of such processes as influence and *demand characteristics* (see chapter 1) than in terms of hypnotists' supposedly mystical powers. The power of suggestion, it appears, is indeed great.

CRITICAL THINKING QUESTIONS

1. Do you think hypnosis can be used to boost the memory of eyewitnesses? Would you recommend this procedure for use by the police? If so, why? If not, why not? (We'll discuss this topic in chapter 6.)
2. Suppose that participants in research using the methods developed by Spanos rejected the suggestion that they had "slipped back into hypnosis." Would that change the results? How?
3. In light of the findings reported in this section, do you think that hypnosis can be a useful technique for reducing pain? In other words, can it be used to reduce the discomfort experienced by persons suffering from chronic pain? If so, why? If not, why?

CONSCIOUSNESS-ALTERING DRUGS: *What They Are and What They Do*

In chapter 2, we saw that drugs are big business in the late twentieth century. Each day, many millions of human beings use drugs to change the way they feel—to alter their moods or states of consciousness. Much of this use of consciousness-altering drugs is completely legal; indeed, many people take such drugs under a physician's supervision. In many other instances, how-

ever, people turn to drugs that are illegal, or use legal ones to excess, in the absence of medical advice. Thus, drug use—and abuse—is certainly a serious social problem in the 1990s. In this final section, therefore, we'll consider several issues relating to the use of consciousness-altering drugs.

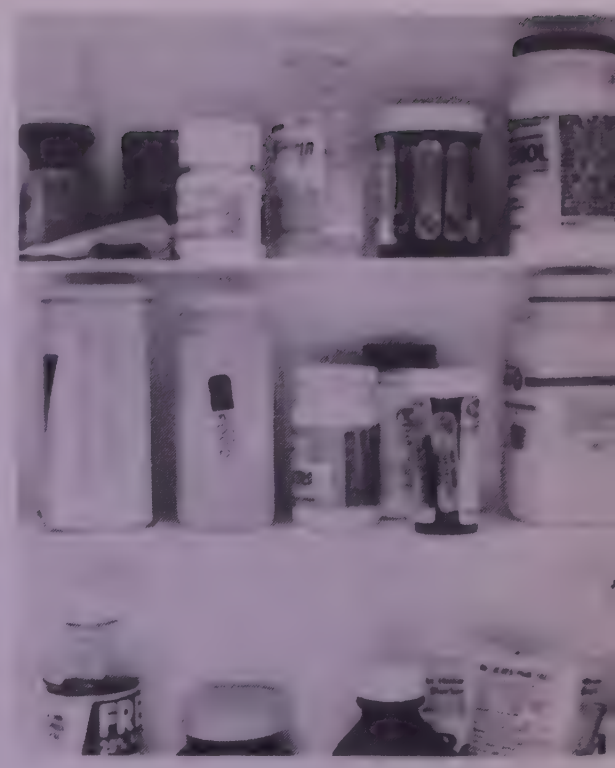
Consciousness-Altering Drugs: Some Basic Concepts

First, what are **drugs**? One widely accepted definition states that they are compounds that, because of their chemical structure, change the structure or function of biological systems (Grilly, 1989). *Consciousness-altering drugs*, therefore, are drugs that produce changes in consciousness when introduced into the body (Wallace & Fisher, 1987).

Suppose you went to your family medicine cabinet and conducted a careful inventory of all the drugs present. How many would you find? Unless your family is very unusual, quite a few. To the extent these drugs were prescribed by a physician and were used for medical purposes, taking them would probably be appropriate. The term **drug abuse**, therefore, is usually restricted to instances in which people take drugs purely to change their moods, and in which they experience impaired behavior or social functioning as a result of doing so (Wallace & Fisher, 1987).

Unfortunately, when people consume consciousness-altering drugs on a regular basis, they often develop **dependence**—they come to need the drug and cannot function without it. Two types of dependence exist. One, **physiological dependence**, occurs when the need for the drug is based on organic factors, such as changes in metabolism. This type of dependence is what is usually meant by the term drug addiction. However, people can also experience **psychological dependence**, in which they experience strong desires to continue using the drug even though, physiologically, their bodies do not need it. As we'll soon see, several psychological mechanisms probably contribute to such dependence. Physiological and psychological dependence often occur together and magnify individuals' cravings for and dependence on specific drugs.

Continued use of a drug over a prolonged period of time often leads to drug **tolerance**—a physiological reaction in which the body requires larger and larger doses in order to experience the same effects. Drug tolerance has been observed in connection with many consciousness-altering drugs and often increases the dangers of using these substances. In some cases, use of one drug increases tolerance for another; this is known as **cross-tolerance**.



Drugs at Home

Does your medicine cabinet look like this one? Most people have a variety of consciousness-altering drugs in their homes.

Drugs: *Chemical substances that change the structure or function of biological systems.*

Drug Abuse: *Instances in which individuals take drugs purely to change their moods, and in which they experienced impaired behavior or social functioning as a result of doing so.*

Dependence: *Strong physiological or psychological need for particular drugs.*

Physiological Dependence: *Strong urges to continue using a drug based on organic factors such as changes in metabolism.*

Psychological Dependence: *Strong desires to continue using a drug even though it is not physiologically addicting.*

Tolerance: *Habituation to a drug, causing larger and larger doses to be required to produce effects of the same magnitude.*

Cross-Tolerance: *Increased tolerance for one drug that develops as a result of taking another drug.*

Psychological Mechanisms Underlying Drug Abuse: Contrasting Views

On the face of it, drug abuse is a puzzling form of behavior. Recreational use of drugs, after all, carries considerable risk of harm, and long-term drug abuse usually undermines the physical and psychological health of those who adopt such practices. Why, then, do so many people engage in this behavior? Let's consider some contrasting explanations.

The Learning Perspective: Rewarding Properties of Consciousness-Altering Drugs Several explanations for why people use consciousness-altering drugs derive from basic principles of learning—principles we'll consider in detail in chapter 5. One approach suggests that people use such

drugs because doing so feels good; in other words, the effects produced by the drugs are somehow rewarding (Wise & Bozarth, 1987). Evidence supporting this view is provided by many studies indicating that animals will self-administer many of the same drugs that people abuse, presumably because they find the effects of these drugs rewarding (Young & Herling, 1986).

On the other side of the coin, use of consciousness-altering drugs has also been attributed to the fact that these substances reduce *negative* feelings, such as stress, anxiety, or physical discomfort. Thus, people take drugs to reduce negative feelings rather than simply to generate positive ones (Tiffany, 1990). This explanation is especially applicable to cases in which individuals have become physiologically dependent on a drug; the negative symptoms they experience when it is no longer consumed—known as *withdrawal*—may provide a powerful incentive to obtain the drug again at all costs.

The Psychodynamic Perspective: Coping with Unconscious Fears and Desires As we saw in chapter 1, the psychodynamic perspective views human behavior as stemming from unconscious conflicts among hidden aspects of personality. This perspective points to another, and very different, explanation for drug abuse: Perhaps individuals use drugs to reduce or at least conceal the anxiety generated by such inner turmoil. While this is an intriguing idea, it is very difficult to test empirically. Thus, it currently receives little attention from psychologists.

The Social Perspective: Drug Abuse and Social Pressure A third perspective suggests that drug abuse can be understood largely in terms of social factors. According to this view, individuals—especially adolescents and young adults—use consciousness-altering drugs because it is the "in" thing to do. They observe their friends using these substances and experience pressure—subtle or overt—to join them (Mann, Chassin, & Sher, 1987). You may well have experienced such pressure yourself; if so, you know hard it can be to resist. We'll examine social influence in detail in chapter 16.

Key Points

- People often use drugs to change the way they feel—their states of consciousness.
- Continued use of a given drug may result in growing tolerance to it and psychological or physiological dependence on it.
- The learning perspective suggests that drug abuse stems from the fact that people find the effects of consciousness-altering drugs rewarding or that these drugs help to reduce stress, anxiety, and other negative feelings.
- The social perspective suggests that people abuse drugs because of strong social pressure to do so.
- The cognitive perspective proposes that drug abuse may be at least in part an automatic behavior triggered by the presence of external cues.

The Cognitive Perspective: Drug Abuse as Automatic Behavior Another, and very intriguing, perspective on the use of consciousness-altering drugs has been proposed by Tiffany (1990). He suggests that in many cases, drug abuse represents a kind of automatic processing on the part of the persons involved. As individuals use various drugs, Tiffany contends, the cognitive systems controlling many aspects of obtaining the drugs and consuming them take on the character of automatic processes. As we discussed earlier in this chapter, this implies that drug use becomes quick and relatively effortless, occurs without conscious intention, is difficult to inhibit, and may even take place in the absence of conscious awareness. Thus, once they have used a drug on a considerable number of occasions, individuals may find themselves responding almost automatically to external cues—for example, a specific environment in which the drug has often been enjoyed, such as a bar, or specific sights and smells associated with drug use, such as the aroma of a burning cigarette. In a similar manner, they may respond automatically to internal cues or emotions, such as wanting to celebrate or feeling tired or out of sorts. These cues may trigger people's tendencies to use drugs, and they may find themselves doing so before they realize it, even without any strong urge to take a drug.

Do you remember the DAMIT dreams—dreams of absent-minded transgression—reported by many persons trying to give up tobacco or alcohol? The content of such dreams captures the kind of automatic drug use suggested by Tiffany. Note that according to Tiffany (1990), strong urges or cravings are not necessary for drug use to occur; such behavior may be initiated in the absence of these urges by appropriate internal or external stimuli.

Tiffany's model has not yet been subjected to extensive test. However, many findings concerning drug abuse appear to be consistent with it. For example, it has often been noted that individuals who were once addicted to a drug and stopped using it are more likely to relapse into using it when experiencing high levels of stress than at other times (Bliss et al., 1989). Tiffany explains these relapses by suggesting that at such times, individuals must use part of their cognitive resources to deal with the stress, thus leaving fewer resources to focus on continued abstinence. The result: they resort to patterns of automatic processing, and this leads them to their drug relapse. Despite such indirect support, Tiffany's (1990) theory must be subjected to additional, systematic testing before it can be accepted. Still, it seems to offer important insights into the nature of drug abuse and drug addiction. As such, the theory deserves further careful attention.

Consciousness-Altering Drugs: An Overview

While many different drugs affect consciousness, most seem to fit under one of four major headings: *depressants, stimulants, opiates,* or *psychedelics* and *hallucinogens*. Please note that these categories are based on the psychological effects of various drugs, not their chemical nature. Several drugs can exert similar effects on mood or consciousness but have fundamentally different chemical formulas, and some drugs with similar chemical formulas can exert very different psychological effects (Pinel, 1993).

Depressants Drugs that reduce both behavioral output and activity in the central nervous system are called **depressants**. Perhaps the most important of these is *alcohol,* undoubtedly the most widely consumed drug in the world. Small doses of alcohol seem, subjectively, to be stimulating—they induce feelings of excitement and activation. Larger doses, however, act as a depressant. They dull the senses so that feelings of pain, cold, and other forms of discomfort become less intense. This is why alcohol was widely used to deaden the pain of medical operations before more effective anesthetics became available. Large doses of alcohol also interfere with coordination and normal functioning of our senses, often with tragic results for motorists, and may disrupt information processing in several respects. (Table 4.3, on page 166, summarizes these effects.) Alcohol also lowers social inhibitions. After consuming large quantities of this drug, people often become more prone to engage in dangerous forms of behavior and more generally unrestrained in their words and actions. Alcohol may produce its pleasurable effects by stimulating special receptors in the brain. Its depressant effects may stem from the fact that it interferes with the capacity of neurons to conduct nerve impulses, perhaps by affecting the cell membrane directly.

Barbiturates, which are contained in sleeping pills and relaxants, constitute a second type of depressant. First manufactured in the late nineteenth century, these drugs depress activity in the central nervous system and reduce activation and mental alertness. How these effects are produced is not certain, but existing evidence suggests that barbiturates may reduce the

Depressants: *Drugs that reduce activity in the nervous system and therefore slow many bodily and cognitive processes. Depressants include alcohol and barbiturates.*

Barbiturates: *Drugs that act as depressants, reducing activity in the nervous system and behavior output.*

Table 4.3

Behavioral Effects of Various Blood Alcohol Levels

Blood Alcohol Level (in milligrams of alcohol per milliliter of blood)	Behavioral Effects
0.05	Lowered alertness, impaired judgment, release of inhibitions, good feelings
0.10	Slowed reaction times and impaired motor function, less caution
0.15	Large, consistent increases in reaction time
0.20	Marked depression in sensory and motor capability, decidedly intoxicated behavior
0.25	Severe motor disturbance and impairment of sensory perceptions
0.30	In a stupor but still conscious—no comprehension of events in the environment
0.35	Surgical anesthesia; lethal dose for about 1 percent of the population
0.40	Lethal dose for about 50 percent of the population

release of excitatory neurotransmitters by neurons in many different locations. Initially, high doses of barbiturates can produce feelings of relaxation and euphoria—a kind of drunkenness without alcohol. They often go on to produce serious confusion, slurred speech, memory lapses, and reduced ability to concentrate. Wide swings of emotion, from euphoria to depression, are also common. Extremely large doses can be fatal, because they result in paralysis of centers of the brain that regulate respiration. This is a real danger, since tolerance to barbiturates gradually develops, so individuals find it necessary to increase the doses they consume to obtain the same effects.

Because some barbiturates induce sleep, people often try to use them to treat sleep disorders such as insomnia. However, these drugs do not seem to produce normal sleep. In particular, REM sleep is suppressed and may rebound after individuals stop taking the drugs.

Stimulants: *Drugs that increase activity in the nervous system, including amphetamines, caffeine, and nicotine.*

Amphetamines: *Drugs that act as stimulants, increasing feelings of energy and activation.*

Cocaine: *A powerful stimulant that produces pleasurable sensations of increased energy and self-confidence.*

STIMULANTS Drugs that produce the opposite effects, feelings of energy and activation, are known as **stimulants**. Included in this category are **amphetamines** and **cocaine**. Both of these stimulants inhibit the reuptake of the neurotransmitters dopamine and norepinephrine. As a result, neurons that would otherwise stop firing continue to respond. Such drugs raise blood pressure, heart rate, and respiration—all signs of activation or arousal produced by the sympathetic nervous system. In addition, stimulants yield short periods of pleasurable sensations, twenty to forty minutes during which users feel incredibly powerful and energetic. Users pay dearly for such feelings, however, for as the drug wears off they often experience an emotional crash marked by strong anxiety, depression, and fatigue.

In the past, cocaine was widely hailed as a valuable medical drug and was added to many patent medicines. Freud believed that it was useful in treating such varied illnesses as asthma, indigestion, and even addiction to alcohol or morphine. But continued use of cocaine can produce harmful effects, including a loss of appetite and intense feelings of anxiety, so it is clearly a dangerous drug.

Cocaine is usually consumed by *snorting*, a process in which it is inhaled into each nostril. There it is absorbed through the mucous lining directly into the bloodstream. Cocaine can also be swallowed, usually in liquid form, but this produces weaker effects. When cocaine is heated and treated chemically, a form known as **crack** is produced. This can be smoked, and when it is, the drug affects the brain almost instantly. This produces a high during which individuals experience powerful feelings of energy, confidence, and excitement. While cocaine is not usually considered to be addicting, it often produces strong psychological dependence. And crack appears to have even stronger effects of this type. In order to obtain it, heavy users turn to prostitution, theft, and anything else they can think of that will provide enough money for the next "hit," or dose.

Other stimulants in common use include *caffeine*, found in coffee, tea, and many soft drinks, and *nicotine*, found in tobacco.

OPIATES Among the most dangerous drugs in widespread use are the **opiates**. These drugs include *opium*, *morphine*, *heroin*, and related synthetic drugs. Opium is derived from the opium poppy; remember the scene in *The Wizard of Oz* when Dorothy falls asleep amidst a field of beautiful poppies? Morphine is produced from opium, while heroin is obtained from morphine. Opiates produce lethargy and a pronounced slowing of almost all bodily functions. These drugs also alter consciousness, producing a dreamlike state and, for some people, intensely pleasurable sensations. The costs associated with these pleasurable sensations are high, however. Heroin and other opiates are extremely addicting, and withdrawal from them often produces agony for former users. Growing evidence indicates that the brain produces substances (*opioid peptides* or *endorphins)* closely related to the opiates in chemical structure and contains special receptors for them (Phillips & Fibiger, 1989). This suggests one possible explanation for the discomfort experienced by opiate users during withdrawal. Regular use of opiates soon overloads endorphin receptors within the brain. As a result, the brain ceases production of these substances. When the drugs are withdrawn, endorphin levels remain depressed. Thus, an important internal mechanism for regulating pain is disrupted (Reid, 1990).

Tolerance for opiates such as heroin increases rapidly with use, so physiological addiction can occur very quickly. The withdrawal symptoms that result when addicts cannot obtain the drug are truly agonizing. Indeed, they are so painful that addicts will go to incredible lengths, and take incredible risks, in order to obtain a steady supply of the drug.

PSYCHEDELICS AND HALLUCINOGENS Perhaps the drugs with the most profound effects on consciousness are the **psychedelics**, drugs that alter sensory perception and so may be considered mind-expanding, and **hallucinogens**, drugs that generate sensory perception for which there are no external stimuli. The most widely used psychedelic drug is *marijuana*. Known use of marijuana dates back to ancient times; indeed, it is described in a Chinese guide to medicines dating from 2737 B.C. Marijuana was widely used in the United States and elsewhere for medical purposes as late as the 1920s. It could be found in almost any drugstore and purchased without a prescription, like aspirin today. It was often prescribed by physicians for headaches, cramps, and even ulcers. Starting in the 1920s, however, the tide of public opinion shifted, efforts were made to make the drug illegal, and by 1937 marijuana was outlawed completely in the United States. When smoked or eaten, as when baked into cookies or cakes, marijuana produces moderate arousal in the form of increased blood pressure and pulse rate; a perceived increase in the intensity of various stimuli, such as sounds, colors, tastes, and smells; and

Crack: *A cocaine derivative that can be smoked. It acts as a powerful stimulant.*

Opiates: *Drugs that induce a dreamy, relaxed state and, in some persons, intense feelings of pleasure. Opiates exert their effects by stimulating special receptor sites within the brain.*

Psychedelics: *Drugs that alter sensory perception and so may be considered mind-expanding.*

Hallucinogens: *Drugs that profoundly alter consciousness, such as marijuana and LSD.*

RIVER PHOENIX (1970–1993)

This actor's life was tragically cut short by a lethal combination of drugs.

distortion in the sense of time, such as a feeling that more time has elapsed during a given period than is actually the case. Unfortunately, marijuana also interferes with the ability to judge distances, an effect that can lead to serious accidents when users of the drug drive a car or operate other equipment. Other effects reported by some, but not all, users include reduced inhibitions, increased sexual pleasure (which may simply reflect increased sensitivity to all sensations), and feelings of relaxation. Some findings, but by no means all, also suggest that marijuana use may interfere with memory (Miller, Cornelius, & McFarland, 1978).

Marijuana is in widespread use throughout the world, mostly as a recreational drug. Unfortunately, there have been few studies of its long-term effects. The research that has been performed reports few adverse effects (e.g., Page, Fletcher, & True, 1988). Yet continued use of marijuana poses certain dangers. First, as already noted, the perceptual distortions it produces can result in tragedy when users attempt to drive or operate power machinery. Also, because it is still illegal in many nations, marijuana is often blended with other substances, so users never know exactly what they are getting. Third, there is some indication that long-term use of marijuana may result in shifts in personality toward passivity and a general lack of motivation (Baumrind, 1984). These potential risks should be carefully weighed against the potential pleasures some people report finding in this drug.

Much more dramatic effects are produced by *hallucinogens*—drugs that produce vivid hallucinations and other perceptual shifts. Of these, the most famous is **LSD** (lysergic acid diethylamide), or *acid*. After taking LSD, many persons report profound changes in perceptions of the external world. Objects and people seem to change color and shape; walls may sway and move; and many sensations seem more intense than normal. There may also be a strange blending of sensory experiences known as *synesthesia*. Music yields visual sensations, while colors produce feelings of warmth or cold. Such effects may sound exciting or even pleasant, but many others produced by LSD are quite negative. Objects, people, and even one's own body may seem distorted or threatening. Users may experience deep sorrow or develop intense fear of close friends and relatives. Perhaps worst of all, the effects of this drug are unpredictable; there is no way of determining in advance whether LSD will yield mostly pleasant or mostly unpleasant sensations. In fact, the same person may experience radically different effects at different times. Unless you are willing to gamble with your own health, therefore, LSD is certainly a drug to avoid. An overview of various drugs and their effects is provided on the **Key Concept** page.

KEY POINTS

- Depressants reduce both behavioral output and activity in the central nervous system. Important depressants include alcohol and barbiturates.
- Stimulants produce feelings of energy and activation. Amphetamines and cocaine fall within this category.
- Opiates produce lethargy and pronounced slowing of almost all bodily functions. They also produce pleasurable sensations for some people, and so are highly addicting.
- Psychedelics such as marijuana alter sensory perception, while hallucinogens such as LSD produce vivid hallucinations and other bizarre perceptual shifts.
- A specific dose of a given drug may produce very different effects on the same person at different times, depending on such factors as physical condition, expectations, other drugs taken recently, and other factors.

LSD: A powerful hallucinogen that produces profound shifts in perception; many of these are frightening in nature.

A NOTE ON THE PSYCHOLOGY OF DRUGS' EFFECTS

In my comments so far, I may have given you the impression that drugs always produce specific effects. Before concluding, I should point out that this impression would not be fully accurate. While specific drugs do generally produce the effects described above, their impact may vary, depending on many other factors.

First, the impact of drugs is often determined by expectations. If users expect a drug to produce certain effects (increase their sex drive, reduce their

Effects of Consciousness-Altering Drugs

Depressants

Reduce behavioral output and activity in the central nervous system

Alcohol

- Deadens pain
- Reduces coordination
- Interferes with normal functioning of senses
- Reduces social inhibitions

Barbiturates

- Reduced mental alertness
- Sleep
- Confusion
- Euphoria
- Memory lapses, inability to concentrate
- Suppression of REM sleep

Stimulants

Induce feelings of energy and activation

Amphetamines

- Elevation of blood pressure, heart rate, respiration
- Feelings of alertness, energy, followed by depression as effects wear off

Caffeine

- Mild feelings of increased alertness
- Mild diuretic effect (increased urination)

Cocaine and Derivatives (including Crack)

- Feelings of tremendous power and energy
- Intense pleasurable sensations
- Psychological dependence (cocaine)
- Powerful addiction (crack)

Opiates

Produce lethargy and pronounced slowing of almost all bodily functions; induce a dreamlike state and pleasurable sensations

Opium

- Deadens pain
- Produces dreamlike state
- Highly addicting
- Causes pleasurable sensations, feelings

Heroin

- Like opium and morphine, but pleasurable sensations are intensified; described by some users as "a whole body orgasm"
- Extremely addicting

Morphine

- Similar to opium but even more pronounced

Psychedelics and Hallucinogens

Psychedelics alter sensory perception; sometimes viewed as mind-expanding. Hallucinogens generate sensory perceptions for which there are no external stimuli

Psychedelics (e.g., Marijuana)

- Moderate arousal
- Increased intensity of various stimuli
- Distortions in sense of time
- Diminished ability to judge distances
- Feelings of increased sexual pleasure for some persons
- Feelings of relaxation

Hallucinogens (e.g., LSD)

- Profound changes in perceptions of external world
- Blending of sensory experiences
- Objects seem to change shape
- Ordinary situations may become threatening or frightening
- Effects of drugs vary greatly on different people

inhibitions, put them in a good mood), such effects are much more likely to occur than if users do not anticipate them.

Second, drug effects depend on users' physical state. Some people are naturally more tolerant of various drugs than others. In addition, the influence of a specific drug may depend on whether the person taking it is fatigued or well rested, whether he or she has recently eaten, and many other factors.

Third, the effects of various drugs depend on previous experience. First-time users of alcohol or tobacco generally report very different reactions to these substances than people who have used them for quite some time. The same thing is true for many other drugs that alter mood or consciousness.

Finally, the influence of a given drug depends on what other drugs users are also taking. In medicine, careful physicians check on the possibility of drug interactions, in which the impact of a drug is altered by the presence of other drugs, before issuing prescriptions. People who take various illegal drugs, however, rarely consider possible interactions between them—sometimes with tragic results.

In sum, the influence of drugs on feelings, behavior, and consciousness is neither certain nor fully predictable. Many factors can determine the magnitude and direction of such effects. This is yet another reason why, where drugs are concerned, the byword should be *caution*.

Making Psychology Part of Your Life

Meditation: A Technique for Inducing Potentially Beneficial Shifts in Consciousness

For centuries, travelers from the West who visited India returned with tales of amazing feats performed by *yogis*—members of special religious orders who seemed to possess incredible powers. Such persons, it was reported, could walk barefoot over hot coals and lie on beds of nails without experiencing pain. Perhaps even more astounding, some seemed able to enter a self-induced trance in which they could bring their own hearts to a virtual stop!

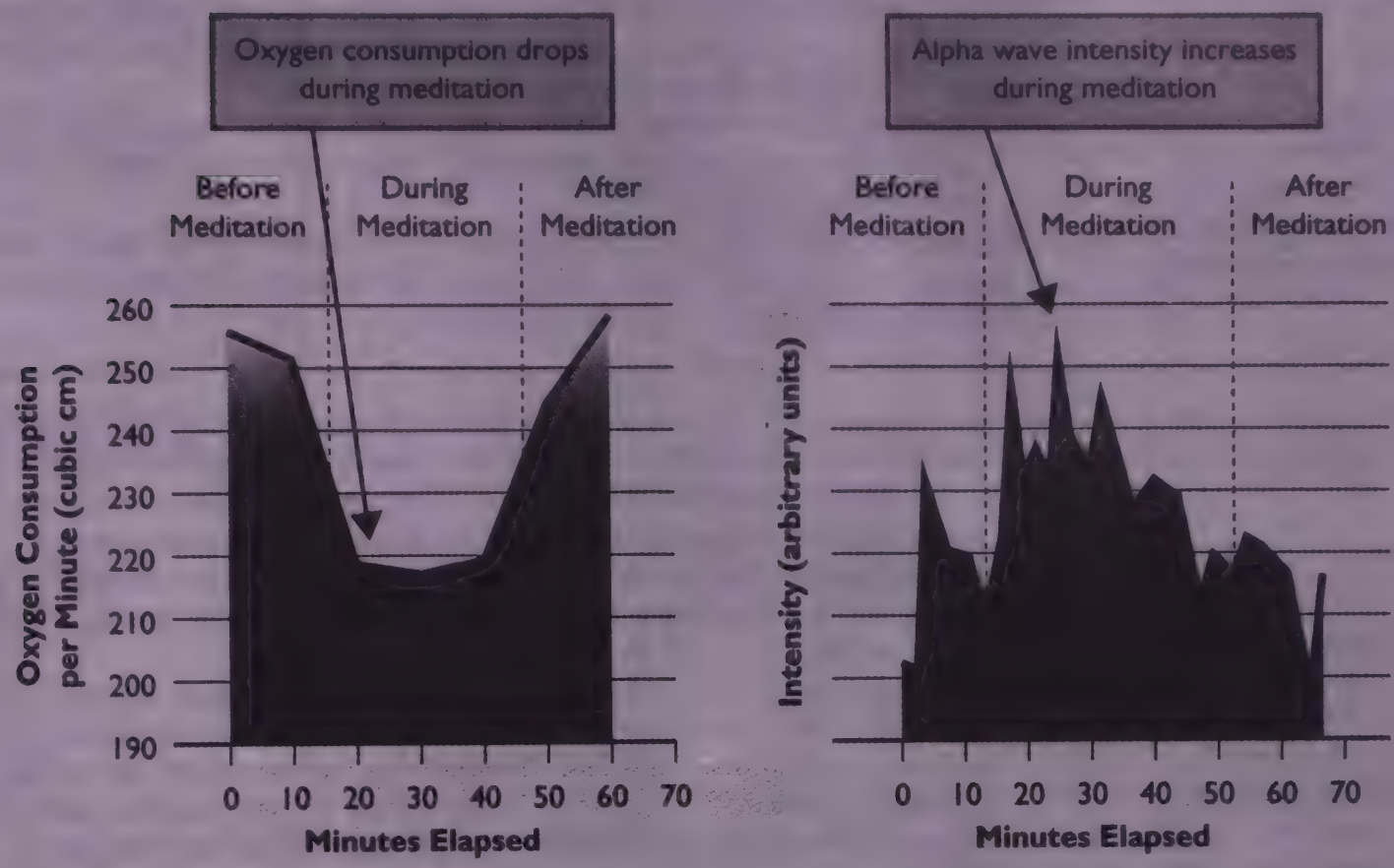
Were such reports actually true? Existing evidence is mixed, at best, but one fact *is* clear: there are indeed techniques through which at least some individuals can produce important shifts in consciousness and enter a state in which they are less responsive than usual to the external world (Shapiro, 1980). Several techniques for producing such changes exist, but among these *meditation* is by far the most popular.

Meditation involves procedures designed to produce altered states of consciousness in which awareness of and contact with the external world are reduced. Many different varieties of meditation exist. One technique that attained widespread popularity during the 1970s is known as *transcendental meditation* (TM for short). Practitioners of TM repeat a word or set of words, known as their *mantra*, over and over again, focusing their attention entirely on this activity and on the mantra rather than on the world around them. If they find their thoughts beginning to wander to something else, they attempt to bring them back to the mantra. This requires considerable cognitive discipline, but this skill must be learned if meditation is to be successful.

Why should anyone bother to meditate? Are there any real benefits from this procedure? Research designed to investigate the physiological effects of meditation suggests that there are. Such research indicates that during meditation, and especially during TM, significant and potentially beneficial changes do occur in basic biological processes. For example, in one well-known study on the effects of TM, Wallace and Benson (1972) found that during meditation people's oxygen consumption decreased, their heartbeat slowed, and they showed stronger alpha brain waves (see Figure 4.6). In other words, they experienced several signs of relaxation and reduced tension. While some researchers suggest that one can obtain similar

Physiological Changes during Meditation FIGURE 4.6

During meditation individuals experience changes in several basic physiological processes. Oxygen consumption decreases and the intensity of alpha waves increases.
(*Source:* Based on data from Wallace & Benson, 1972.)



effects simply by resting (Holmes, 1984), others contend that greater and more general shifts in physiological processes are produced by meditation (Benson & Friedman, 1985). Additional evidence indicates that after adopting TM, many people report finding it easier to give up the use of various drugs, including marijuana, amphetamines, and barbiturates (Marzetta, Benson, & Wallace, 1972). So meditation does seem to have several potential benefits.

Can you enjoy such benefits yourself, without special training and without joining a religious group that makes meditation the center of its philosophy? Yes; transcendental meditation is a relatively simple technique and requires only a few minutes each day. To put it into practice, follow these steps:

1. *Find a quiet, isolated location.* TM doesn't require lots of time, but it *does* require you to focus your attention inward, away from the outside world. So the first requirement is that you find a quiet physical location where you can be alone for twenty minutes to half an hour.

2. *Choose an appropriate mantra.* Meditation derives historically from Buddhism and Hinduism. Thus, in its original form, TM involved choosing a mantra from religious writings. This is not necessary; your mantra can be almost any word or phrase on which you can concentrate.

3. *Meditate.* Repeat your mantra silently, over and over again, and focus your attention only on this word. The hardest part of meditation is learning to keep your thoughts from slipping away from the mantra and back to the normal worries, cares, and concerns of everyday life. At first you may find this difficult, but if you practice and really try, you can acquire such discipline.

4. *Continue meditating for fifteen to twenty minutes.* As you master the skill of focusing your attention on the mantra and screening out other distracting thoughts, gradually increase your period of meditation to fifteen or twenty minutes. (Initially, five to ten minutes will suffice.) If possible, meditate several times each week, especially on days when you feel stressed.

What benefits can you expect to obtain from meditating? Research findings suggest that benefits may include reduced feelings of tension, increased ability to express your feelings freely, and reduced levels of anxiety (Greenberg, 1991). Of course, TM is not for everyone, and if you find it difficult or unappealing, you should consider other techniques for gaining these benefits. If you do find meditation to your liking, however, you may wish to make it part of your daily life.

Summary and Review of Key Points

Biological Rhythms

Key Terms:

states of consciousness, p. 136
biological rhythms, p. 136
circadian rhythms, p. 137
suprachiasmatic nucleus, p. 138
seasonal affective disorder, p. 138

- Biological rhythms involve regular fluctuations in our bodily processes.
- We posses a biological clock that places many of our bodily processes on a twenty-four-hour cycle. Basic components of this clock involve the eyes and a portion of the hypothalamus.
- Large individual differences in circadian rhythms exist. Some people are "larks," most active early in the day, while others are "owls" and are most active later in the day.
- Disturbances in circadian rhythms can be produced by travel across time zones and by shift work. Knowledge of circadian rhythms suggests effective ways of countering such disturbances.

Waking States of Consciousness

Key Terms:

automatic processing, p. 142
controlled processing, p. 142
daydreams, p. 143
fantasies, p. 143
hallucinations, p. 144
self-consciousness, p. 145
control theory of self-consciousness, p. 145
choking under pressure, p. 146

- We are capable of performing many activities without directing conscious attention to them. Such automatic processing does not require much, if any, of our limited attention capacity. In contrast, controlled processing requires conscious attention and does use information-processing capacity.
- Daydreams and fantasies are a common experience for most people. These alterations in consciousness while we are awake may serve several useful functions for us.
- When we focus our attention on ourselves, we enter a state of self-consciousness. We then compare our current states with important goals and values. Heightened self-consciousness can be induced by many factors, including personal dispositions and happy or sad moods. Self-consciousness can reduce performance on skilled tasks; however, it is also an important first step toward increased self-insight.

Sleep

Key Terms:

sleep, p. 147
electroencephalogram (EEG), p. 148
alpha waves, p. 148
delta waves, p. 148
REM sleep, p. 148
insomnia, p. 152
somnambulism, p. 152
night terrors, p. 152
apnea, p. 152
hypersomnias, p. 153
narcolepsy, p. 153
dreams, p. 153
manifest content, p. 155
latent content, p. 155
dreams of absent-minded transgression, p. 157

- An important method for studying sleep utilizes recordings of electrical activity in the brain during sleep—the EEG. As we sleep, we pass through several different stages in which changes occur in brain activity and awareness of the external world.
- During REM sleep the EEG shows a pattern similar to that of waking, but body muscle activity is almost totally suppressed. Most dreams occur during REM sleep.
- Although people undergoing sleep deprivation report feeling tired, they can function quite well even after long periods without sleep. However, growing evidence indicates that sleep does serve important functions related to restoration of bodily resources and circadian rhythms that are a function of our biological evolution.
- Several different sleep disorders exist. Insomnia is difficulty in falling asleep; somnambulism is walking in one's sleep; narcolepsy is a tendency to fall suddenly into a deep sleep in the midst of waking activities.
- Dreams occur primarily during REM sleep. Everyone dreams, but not all dreams are remembered. Freud believed that dreams reflect suppressed thoughts, impulses, and wishes. A physiological interpretation suggests that dreams reflect the brain's interpretation of random neural activity during sleep. A cognitive view suggests that dreams result from the fact that many systems of the brain are active during sleep while input from muscles and sensory systems is inhibited.
- Cross-cultural research indicates that the content and meaning of dreams are strongly influenced by the dreamer's culture.

HYPNOSIS Key Terms: hypnosis, p. 158 neodissociation theory, p. 160	• Hypnosis involves a condition in which individuals are highly susceptible to suggestions from others. • One theory of hypnosis, the social-cognitive view, suggests that the effects of hypnosis stem from the hypnotized person's expectations and his or her efforts to play the role of hypnotized subject. • Another view, the neodissociation theory, suggests that hypnotism involves splits in consciousness; hypnotized persons are unaware of experiences during hypnosis and cannot exert normal control over their own behavior.
CONSCIOUSNESS-ALTERING DRUGS Key Terms: drugs, p. 163 drug abuse, p. 163 dependence, p. 163 physiological dependence, p. 163 psychological dependence, p. 163 tolerance, p. 163 cross-tolerance, p. 163 depressants, p. 165 barbiturates, p. 165 stimulants, p. 166 amphetamines, p. 166 cocaine, p. 166 crack, p. 167 opiates, p. 167 psychedelics, p. 167 hallucinogens, p. 167 LSD, p. 168	• People often use drugs to alter their states of consciousness. Continued use of a given drug may result in growing tolerance to it and psychological or physiological dependence on it. • There are several perspectives concerning the nature of drug abuse. The learning perspective suggests that drug abuse stems from the fact that people find the effects of consciousness-altering drugs rewarding or that these drugs help to lessen stress, anxiety, and other negative feelings. • The social perspective suggests that people abuse drugs because of strong social pressures to do so. • The cognitive perspective proposes that drug abuse may be at least in part an automatic behavior triggered by the presence of external cues. • Depressants reduce both behavioral output and activity in the central nervous system. Important depressants include alcohol and barbiturates. • Stimulants produce feelings of energy and activation. Amphetamines and cocaine fall within this category. • Opiates produce lethargy and pronounced slowing of almost all bodily functions. They also produce pleasurable sensations for some people, and so are highly addicting. • Psychedelics such as marijuana alter sensory perception, while hallucinogens such as LSD produce vivid hallucinations and other bizarre perceptual shifts. • A specific dose of a given drug may produce very different effects on the same person at different times, depending on such factors as physical condition, expectations, other drugs taken recently, and other factors.

CRITICAL THINKING QUESTIONS

APPRAISAL	Today, most psychologists believe that states of consciousness can be studied in a scientific manner. Do you agree? Or do you feel that this is stretching the banner of science beyond the breaking point? Why do you hold the opinion that you do?
CONTROVERSY	Hypnotism is one of the most controversial topics of research in modern psychology. Many psychologists doubt that hypnosis represents an altered state of consciousness, while others believe that it does. What are your views on this topic?
MAKING PSYCHOLOGY PART OF YOUR LIFE	Now that you have some basic understanding of biological rhythms, states of consciousness, self-consciousness, and the nature of sleep, try to think of ways in which you can put this knowledge to practical use. For example, what steps might you take to schedule your day so as to take advantage of high points in your own circadian rhythm? How can you help assure that you get a good night's sleep as often as possible? List at least three ways in which you can benefit from your increased understanding of various states of consciousness.

Learning:

How We're Changed by Experience

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- *Classical Conditioning: Exceptions to the Rules*
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5

Have you ever gotten ill after eating a favorite food—and wondered why, even years later, just the thought of it makes you feel sick? How do animals at Sea World learn to perform complex sequences of behaviors, while your dog does not seem to comprehend even simple commands like "sit"? Does watching violence on television cause children to perform violent acts? Why do gamblers continue to put money into slot machines, even after losing a bundle? If you've wondered about issues like these, then you are already familiar with one of the most basic topics in psychology—*learning*. Indeed, the learning process is crucial to all organisms, including people, since it helps us adapt to changing conditions in the world around us.

In this chapter we'll examine several basic principles that help to explain how many forms of behavior are affected by experience. Psychologists refer to these effects on behavior as learning. Specifically, they define **learning** as *any relatively permanent change in behavior, or behavior potential, produced by experience.* Several aspects of this definition are noteworthy. First, the term *learning* does not apply to temporary changes in behavior such as those stemming from fatigue, drugs, or illness. Second, it does not refer to changes resulting from maturation—the fact that you change in many ways as you grow and develop. Third, learning can result from *vicarious* as well as from direct experiences; in other words, you can be affected by observing events and behavior in your environment as well as by participating in them (Bandura, 1986). Finally, the changes produced by learning are not always positive in nature. As you well know, people are as likely to acquire bad habits as good ones.

THE LEARNING PROCESS IS CRUCIAL TO ALL ORGANISMS, INCLUDING PEOPLE, SINCE IT HELPS US ADAPT TO CHANGING CONDITIONS IN THE WORLD AROUND US.

There can be no doubt that learning is a key process in human behavior. Indeed, it appears to play an important role in virtually every activity we perform—from mastering complex skills to falling in love. Although the effects of learning are diverse, many psychologists believe that learning occurs in several basic forms: *classical conditioning*, *operant conditioning*, and *observational learning*. We'll begin with *classical conditioning*, a form of learning in which two stimulus events become associated in such a way that the occurrence of one event reliably predicts the occurrence of the other. Classical conditioning is the basis for many learned fears and also helps explain how we acquire taste aversions. Next, we'll turn to *operant conditioning*, a form of learning in which organisms learn associations between behaviors and their consequences. Here, we'll see how psychologists have applied basic operant principles to promote certain behaviors, such as using safety belts, conserving energy, and recycling. Finally, we'll explore *observational learning*, a form of learning in which organisms learn by observing the behaviors—and the consequences of the behaviors—of others around them.

CLASSICAL CONDITIONING: *Learning That Some Stimuli Signal Others*

Consider the following situation: During a particularly hectic semester, you find yourself with a class schedule that leaves absolutely no time for lunch. After a few days, you lose your ability to concentrate during your afternoon classes because all you can think about is food. A friend tells you about a vending area where she buys microwaveable snacks, including popcorn. As it turns out, this solution works out well; you love popcorn, it is ready in only a few minutes, and you find that it is even possible to do other things while the popcorn is popping—like cram for tests—since a loud beep from the microwave signals when the popcorn is done. When you open the door of the microwave, the delightful aroma of freshly popped popcorn rushes out, causing you to salivate in anticipation of eating it. After several days, however, your mouth waters immediately after the beep, before you actually open the door to the microwave. Why should this occur? After all, at this point you can neither see nor smell the popcorn. The reason is actually fairly simple:

***Learning**: Any relatively permanent change in behavior (or behavior potential) resulting from experience.*

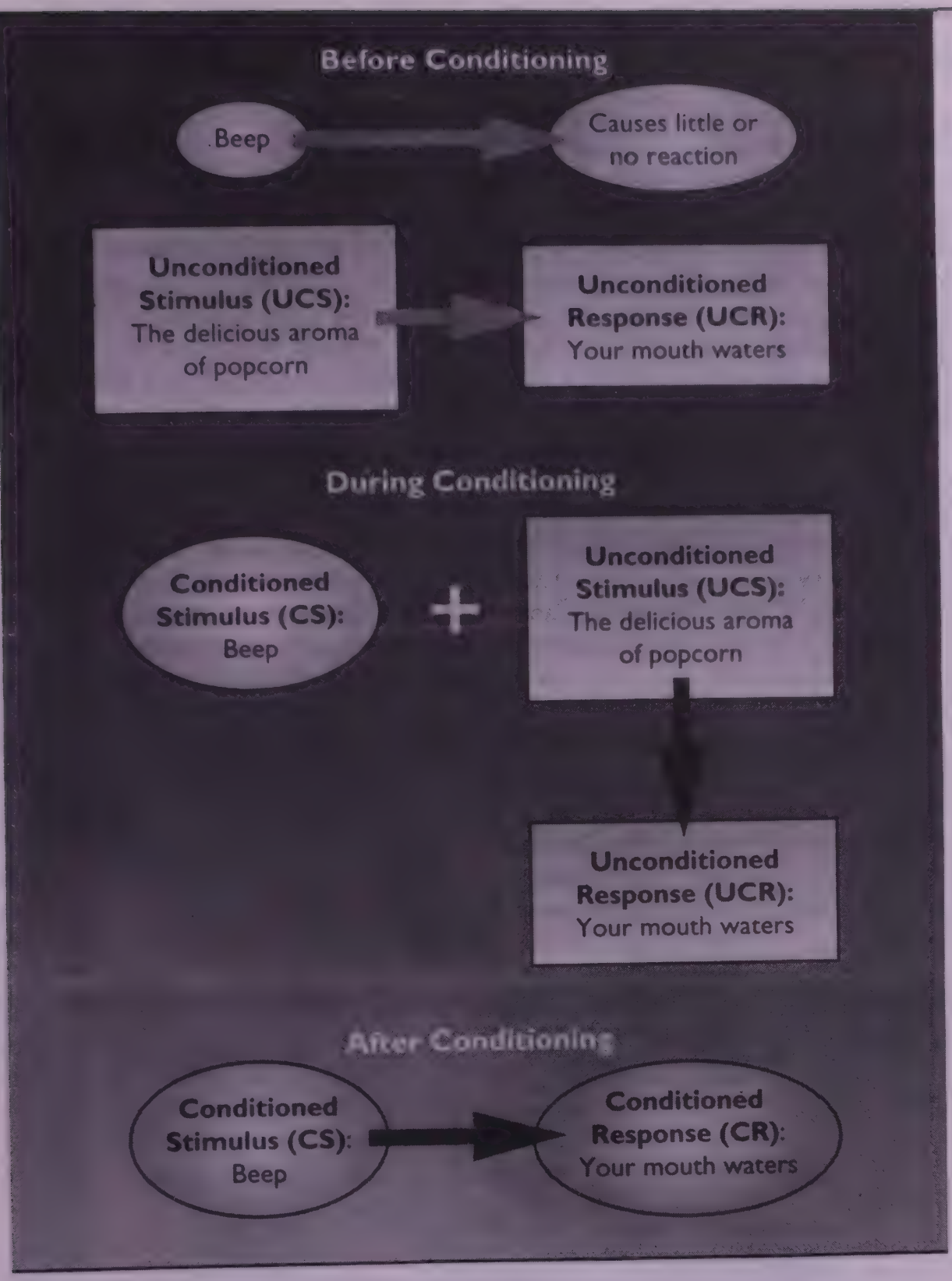


FIGURE 5.1

Classical Conditioning: A Simple Example

At first, the sound of the microwave's beep may startle you and cause you to look toward its source, but it will probably not cause you to salivate. However, after the beep has been paired with the aroma and taste of the popcorn on several occasions, you may find that you salivate to the beep alone. This "mouth-watering" reaction is a result of classical conditioning.

Since the beep is always followed by the aroma and taste of the popcorn, the beep comes to serve as a signal. Just hearing the beep, you expect the smell and taste of the popcorn to follow, and you react accordingly (see Figure 5.1).

The situation just described is a common example of **classical conditioning**, the first type of learning that we will consider. In classical conditioning, a physical event—termed a **stimulus**—that initially does not elicit a particular response gradually acquires the capacity to elicit that response as a result of repeated pairing with a stimulus that *can* elicit a reaction. Learning of this type is quite common and seems to play a role in such varied reactions as strong fears, taste aversions, some aspects of sexual behavior, and even racial or ethnic prejudice (Baron & Byrne, 1994). Classical conditioning became the subject of careful study in the early twentieth century, when Ivan Pavlov, a Nobel Prize–winning physiologist from Russia, identified it as an important behavioral process.

Classical Conditioning: *A basic form of learning in which one stimulus comes to serve as a signal for the occurrence of a second stimulus. During classical conditioning, organisms acquire information about the relations between various stimuli, not simple associations between them.*

Stimulus: *A physical event capable of affecting behavior.*

Pavlov's Early Work on Classical Conditioning: Does This Ring a Bell?

In one of those strange twists of fate that seem so common in the history of science, Pavlov did not set out to investigate classical conditioning. Rather, his research focused on the process of digestion in dogs. During his investigations he noticed a curious fact: Similar to the popcorn example described above, the dogs in his studies often began to salivate when they saw or smelled food but before they actually tasted it. Some even salivated at the sight of the pan where their food was kept or at the sight or sound of the person who usually brought it. This suggested to Pavlov that these stimuli had somehow become signals for the food itself: The dogs had learned that when the signals were present, food would soon follow.

Pavlov quickly recognized the potential importance of this observation and shifted the focus of his research accordingly. The procedures that he now developed were relatively simple. Dogs were placed in an apparatus similar to that shown in Figure 5.2. On *conditioning trials*, a neutral stimulus that had previously been shown to have no effect on salivation—a bell, for example—was presented. This was immediately followed by a second stimulus known to produce a strong effect on salivation: dried meat powder placed directly into the dog's mouth. The meat powder was termed the **unconditioned stimulus** (**UCS**), because its ability to produce salivation was automatic and did not depend on the dog's having learned the response. Similarly, the response of salivation to the meat powder was termed an **unconditioned response** (**UCR**); it too did not depend on previous learning. The bell was termed a **conditioned stimulus** (**CS**), because its ability to produce salivation depended on its being paired with the meat powder. Finally, salivation in response to the bell was termed a **conditioned response** (**CR**).

Unconditioned Stimulus (UCS): *In classical conditioning, a stimulus that can elicit an unconditioned response the first time it is presented.*

Unconditioned Response (UCR): *In classical conditioning, the response elicited by an unconditioned stimulus.*

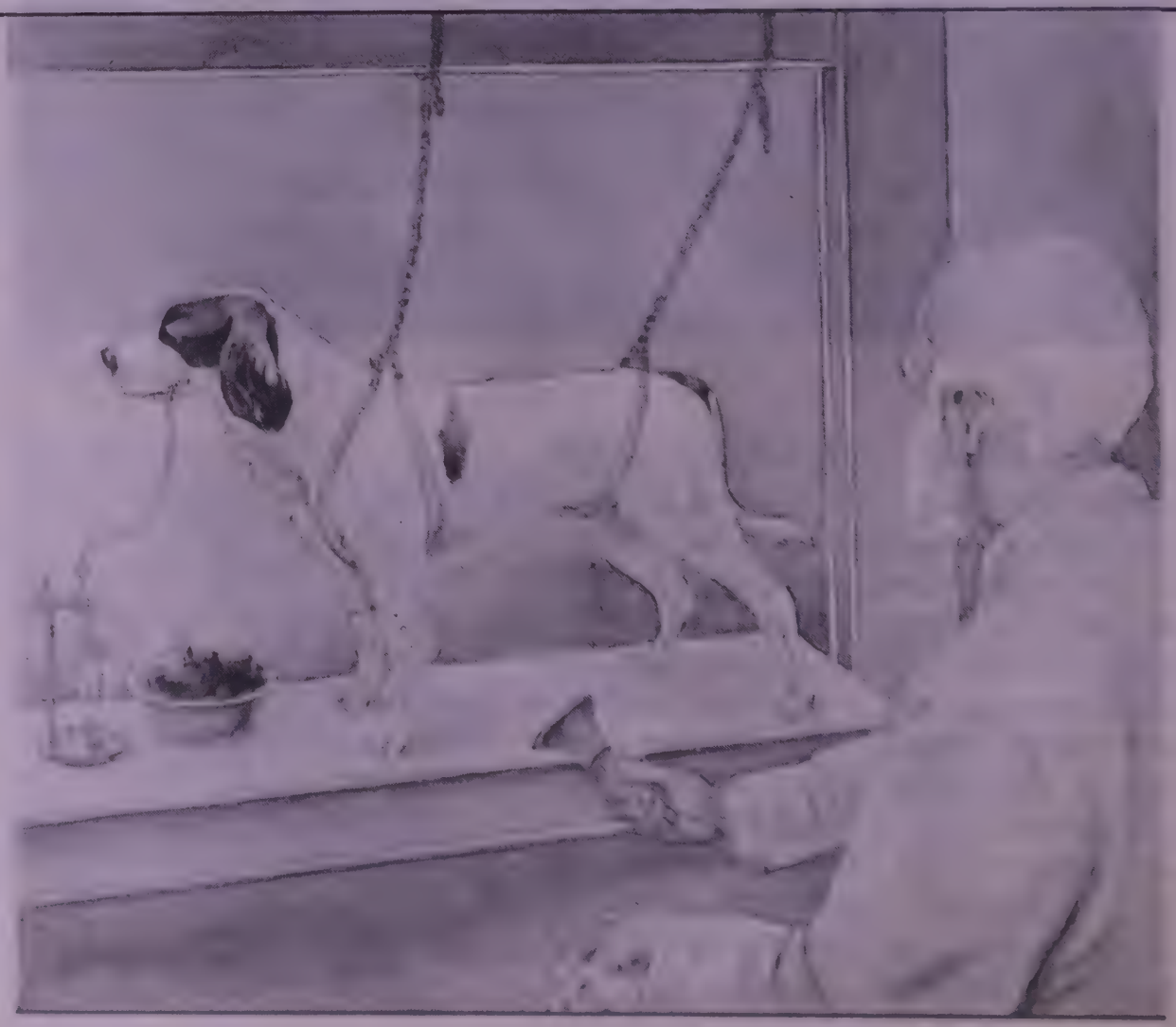
Conditioned Stimulus (CS): *In classical conditioning, the stimulus that is repeatedly paired with an unconditioned stimulus.*

Conditioned Response (CR): *In classical conditioning, the response to the conditioned stimulus.*

FIGURE 5.2

Pavlov's Apparatus for Studying Classical Conditioning

Pavlov used equipment similar to this in his early experiments on classical conditioning. He attached a tube to a dog's salivary gland, which had been surgically moved to the outside of the dog's cheek to allow easy collection of saliva. He then measured the number of drops of saliva that occurred naturally when a bell was sounded. Next, he measured the number of drops of saliva that occurred when a bell was sounded along with the presentation of food. Pavlov found that after repeated presentations of the bell followed by food, the dog's saliva increased as soon as the bell was sounded, indicating that it had learned to associate the food and the bell.



The basic question was whether the sound of the bell would gradually elicit salivation in the dogs as a result of its repeated pairing with the meat powder. In other words, would the bell elicit a conditioned response when it was presented alone? The answer was clearly *yes*. After the bell had been paired repeatedly with the meat powder, the dogs salivated upon hearing it, even when the bell was not followed by the meat powder.

Classical Conditioning: Some Basic Principles

Let's turn now to the principles that govern the occurrence of classical conditioning.

Acquisition: The Course of Classical Conditioning In most instances, classical conditioning is a gradual process in which a conditioned stimulus gradually acquires the capacity to elicit a conditioned response as a result of repeated pairing with an unconditioned stimulus. This process—termed **acquisition**—often occurs as shown in panel A of Figure 5.3 (on page 180). At first conditioning proceeds quite rapidly, increasing as the number of pairings between conditioned and unconditioned stimulus increases. However, there is a limit to this effect; after a number of pairings of CS and UCS, acquisition slows down and finally levels off.

Although psychologists initially believed that conditioning was determined primarily by the number of conditioned-unconditioned stimulus pairings, we now know that this process is affected by other factors. As shown in Figure 5.4 (on page 181), one such factor is *temporal arrangement* of the CS–UCS pairings. Temporal means time-related: the extent to which a conditioned stimulus precedes or follows the presentation of an unconditioned stimulus. The first two temporal arrangements shown, **delayed conditioning** and **trace conditioning**, are examples of what is termed *forward conditioning*, since the presentation of the conditioned stimulus (light) always precedes the presentation of the unconditioned stimulus (shock). They differ, however, in that the CS and the UCS overlap to some degree in *delayed* conditioning, but not in *trace* conditioning. Two other temporal arrangements are **simultaneous conditioning**, in which the conditioned and unconditioned stimuli begin and end at the same time; and **backward conditioning**, in which the unconditioned stimulus precedes the conditioned stimulus.

The results of systematic research suggest that *delayed conditioning* is generally the most effective method for establishing a conditioned response. This is because the conditioned stimulus often plays an important role in predicting forthcoming presentations of the unconditioned stimulus (Lieberman, 1990). To illustrate this point, consider the following example: You are taking a shower when suddenly the water turns icy cold. Your response—a startle reaction to the cold water—is an unconditional response. Now imagine that just before the water turns cold, the plumbing makes a slight grinding sound. Because this sound occurs just before the icy water, delayed conditioning can occur. If this situation is repeated several times, you may acquire a startle reaction to the slight grinding sound; it serves as a conditioned stimulus. In contrast, suppose you do not hear the sound until after the water turns cold, as in backward conditioning, or until the precise instant at which it turns cold, as in simultaneous conditioning. In these cases, you would probably not acquire a startle reaction to the grinding sound, since it provides no information useful in predicting the occurrence of the icy water.

Conditioning also depends on the *conditioned stimulus–unconditioned stimulus interval:* the time interval between presentations of the two stimuli. Extremely short intervals—less than 0.2 second—rarely produce condition-

Acquisition*: The process by which a conditioned stimulus acquires the ability to elicit a conditioned response through repeated pairings of an unconditioned stimulus with the conditioned stimulus.*

Delayed Conditioning*: A form of forward conditioning in which the presentation of the conditioned stimulus precedes, but overlaps with, the presentation of the unconditioned stimulus.*

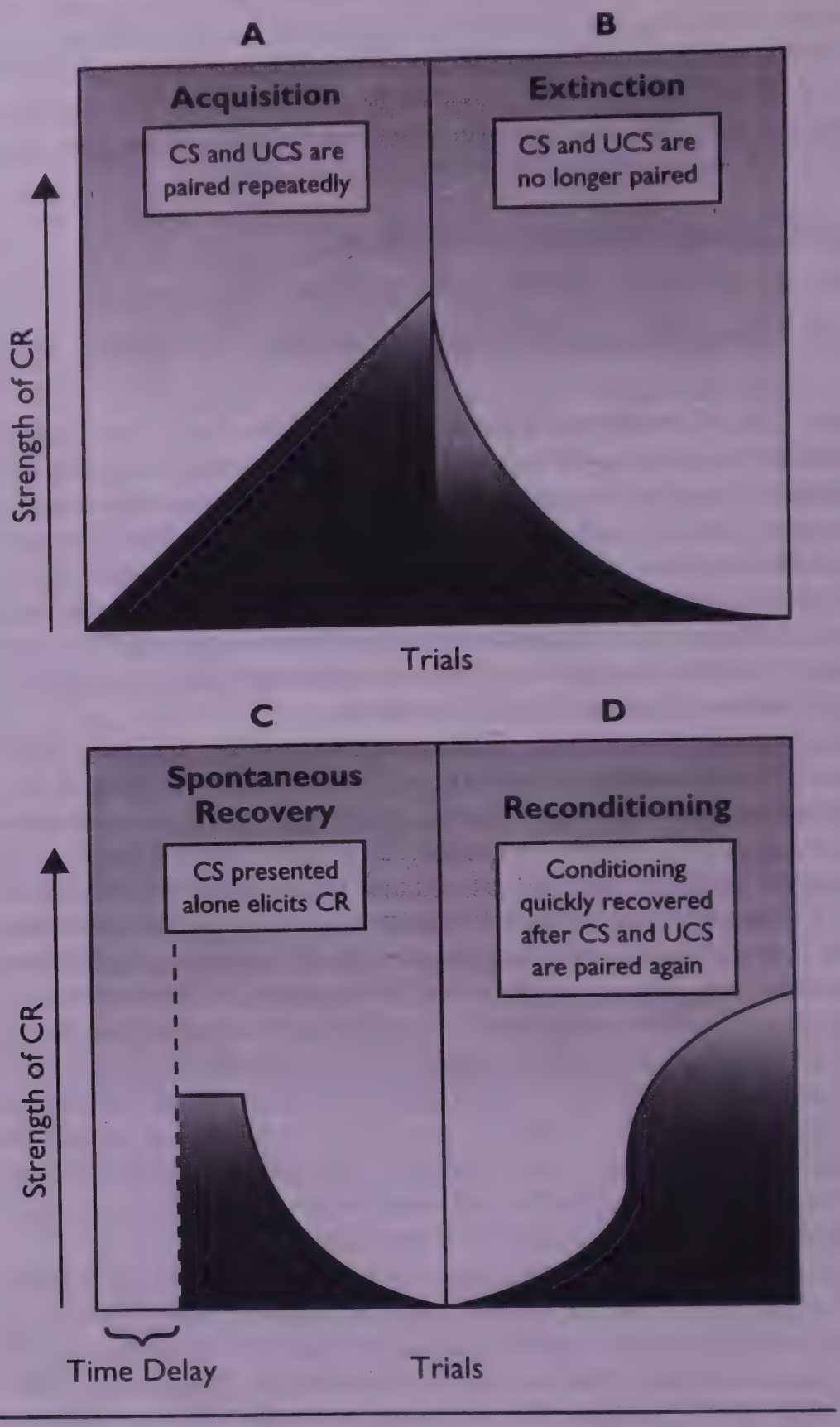
Trace Conditioning*: A form of forward conditioning in which the presentation of the conditioned stimulus precedes and does not overlap with the presentation of the unconditioned stimulus.*

Simultaneous Conditioning*: A form of conditioning in which the conditioned stimulus and the unconditioned stimulus begin and end at the same time.*

Backward Conditioning*: A type of conditioning in which the presentation of the unconditioned stimulus precedes and does not overlap with the presentation of the conditioned stimulus.*

The Course of Conditioning

The strength of the conditioned response rapidly increases during *acquisition* (panel A). The process of *extinction* begins once the conditioned stimulus is no longer paired with the unconditioned stimulus (panel B). As shown in panels C and D, extinction can be disrupted through the processes of *spontaneous recovery* and *reconditioning*. Finally, although not shown in the figure, if no subsequent conditioned stimulus–unconditioned stimulus pairings occur, the conditioned response will decrease once again.



ing. In animal research, the optimal CS–UCS interval seems to be between 0.2 and 2 seconds; longer intervals make it difficult for animals to recognize the conditioned stimulus as a signal for some future event (Gordon, 1989).

In general, conditioning is faster when the *intensity* of either the conditioned or unconditioned stimulus increases. However, it is not necessarily the absolute intensity of stimuli that is most important to the conditioning process, but rather its intensity relative to other background stimuli. A study by Kamin (1965) helps illustrate this point. In this study, the conditioned stimulus was not a discrete stimulus; instead it was a contrast created by a reduction in the usual level of background noise. All subjects in the study (laboratory rats) were first exposed to "white noise" at a level of 80 decibels. Then the subjects were divided into groups that received varying reductions in this noise level as the conditioned stimulus. The reduction in noise was

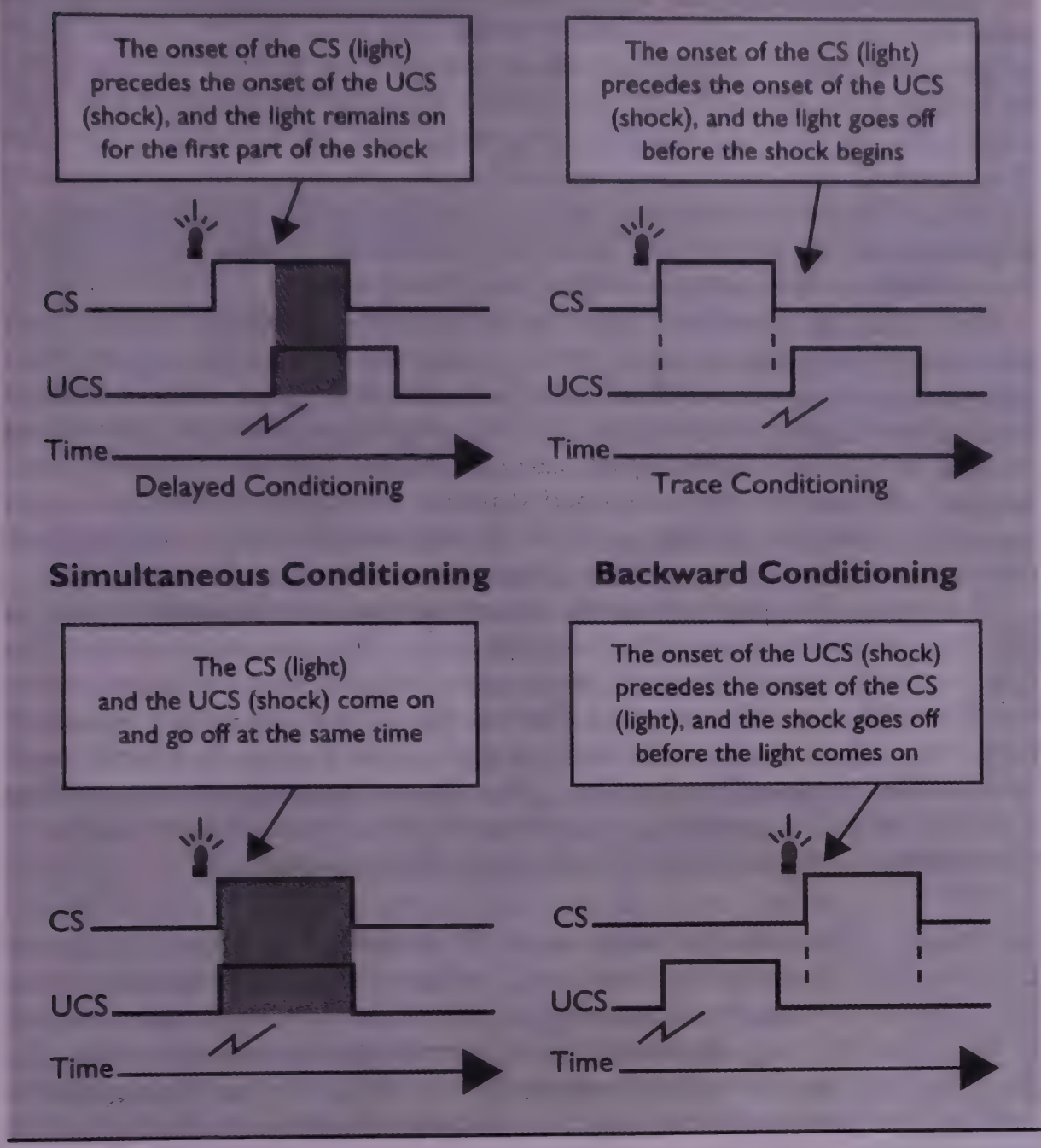


FIGURE 5.4

Temporal Arrangement of the CS and UCS Affects the Acquisition of a Conditioned Response

Four CS–UCS temporal arrangements commonly used in classical conditioning procedures are shown. *Temporal* means time-related: the extent to which a conditioned stimulus precedes or follows the presentation of an unconditioned stimulus. *Delayed conditioning* generally produces the most rapid learning. *Simultaneous conditioning* and *backward conditioning* are usually the least effective procedures.

always followed by an unconditioned stimulus, an electrical shock. The rats receiving the largest reduction in noise level as a conditioned stimulus—which interestingly was also the least intense level of noise in absolute terms—demonstrated the greatest evidence of conditioning. The results of this study show that conditioning is more likely when conditioned stimuli stand out, relative to other background stimuli.

Finally, *familiarity* can greatly affect conditioning. In contrast to the laboratory, where stimuli selected for study are often novel, many of the potential conditioning stimuli found in the environment are familiar to us. Thus, our day-to-day experiences often teach us that certain stimuli, such as the background noise usually present in an office setting or the odors ordinarily present in our homes, do not predict anything unusual. In other words, we learn that these stimuli are largely irrelevant, which makes future conditioning of them difficult (Baker & Mackintosh, 1977).

EXTINCTION: ONCE CONDITIONING IS ACQUIRED, HOW DO WE GET RID OF IT? You are one of several executives in a large marketing firm. You and your coworkers have been working night and day to prepare a proposal crucial to the survival of the firm, and things are not going well. Over the past week the president of the company has chewed you out at least a dozen times.

Now, whenever you hear the unmistakable sound of his approaching footsteps, your heart starts racing and your mouth gets dry, even though he has not yet reached your office. Fortunately, the story has a happy ending—the company's directors are impressed by the proposal, and your boss is no longer angry when he enters your office. Will you continue to react strongly to his footsteps? In all likelihood, you won't. Gradually, his footsteps will cease to elicit the original conditioned response from you. The eventual decline and disappearance of a conditioned response in the absence of an *un*conditioned stimulus is known as **extinction** (refer back to Figure 5.3). Extinction plays an important role, for if it did not occur, we would soon become walking collections of useless—but persistent—conditioned responses.

The course of extinction, however, is not always entirely smooth. Let's consider the behavior of one of Pavlov's dogs to see why this is true. After many presentations of a bell (conditioned stimulus) in the absence of meat powder (unconditioned stimulus), the dog no longer salivates in response to the bell. In other words, extinction has occurred. But if the conditioned stimulus (the bell) and the unconditioned stimulus (the meat powder) are again paired after the conditioned response of salivation has been extinguished, salivation will return very quickly—a process termed **reconditioning.**

Or suppose that after extinction, the experiment is interrupted: Pavlov is caught up in another project that keeps him away from his laboratory, and the dog, for several weeks. Now will the sound of the bell, the conditioned stimulus, elicit salivation? The answer is yes, but the reaction will be in a weakened form. The reappearance of the reaction after a time interval is referred to as **spontaneous recovery**. If extinction is then allowed to continue—that is, if the sound of the bell is presented many times in the absence of meat powder—salivation to the sound of the bell will eventually disappear.

***Extinction**: The process through which a conditioned stimulus gradually loses the ability to elicit conditioned responses when it is no longer followed by the unconditioned stimulus.*

***Reconditioning**: The rapid recovery of a conditioned response to a CS–UCS pairing following extinction.*

***Spontaneous Recovery**: Following extinction, return of a conditioned response upon reinstatement of CS–UCS pairings.*

***Stimulus Generalization**: The tendency of stimuli similar to a conditioned stimulus to elicit a conditioned response.*

***Stimulus Discrimination**: The process by which organisms learn to respond to certain stimuli but not to others.*

Generalization and Discrimination: Responding to Similarities and Differences Suppose that because of several painful experiences, a child has acquired a strong conditioned fear of hornets: Whenever she sees one or hears one buzzing, she shows strong emotional reactions and heads for the hills. Will she also experience similar reactions to other flying insects, such as flies? She almost certainly will, because of a process called **stimulus generalization**, the tendency of stimuli similar to a conditioned stimulus to elicit similar conditioned responses (Honig & Urcuioli, 1981; Pearce, 1986). As you can readily see, stimulus generalization often serves a useful function. In this example, it may indeed save the girl from additional stings. The red lighted signals that we encounter at certain intersections while driving also illustrate the important function served by stimulus generalization: Even though these signals often vary in brightness or shape, we learn to stop in response to all of them, and it's a good thing we do.

Many other species also turn the existence of stimulus generalization to their advantage. For example, some totally harmless insects resemble more dangerous species in coloring and so ward off would-be predators. Similarly, some frogs that would make a tasty mouthful for birds show markings highly similar to those of poisonous species, increasing their chances of survival.

Although stimulus generalization can serve an important adaptive function, it is not always beneficial and in some cases can be dangerous. For example, because of many pleasant experiences with parents and other adult relatives, a young child may become trusting of all adults through stimulus generalization. Unfortunately, this process will not be beneficial if it extends to certain strangers. You can understand why stimulus generalization can be maladaptive—even deadly. Fortunately, most of us avoid such potential problems through **stimulus discrimination**—a process of learning to re-

spond to certain stimuli but not to others. Perhaps a recent incident from my own life will illustrate this concept. About a year ago a friend was badly bitten by a dog. Until that incident she had no fear of dogs. Because she was so frightened by the attack, I was concerned that the incident would generalize to other breeds of dogs—perhaps even to her own dog. Fortunately, because of stimulus discrimination, this didn't happen; she becomes fearful only when she encounters the breed of dog that bit her.

Classical Conditioning: Exceptions to the Rules

When psychologists began the systematic study of learning, around the turn of the century, they noticed that some species could master certain tasks more quickly than others could. Such findings sparked little interest, though, because early researchers saw their task as that of establishing general principles of learning—principles that applied equally well to all organisms and to all stimuli. For several decades it was widely assumed that such principles existed. Beginning in the 1960s, however, some puzzling findings began to accumulate. These results suggested that not all organisms learn all responses or all associations between stimuli with equal ease.

The most dramatic evidence pointing to such conclusions was reported by Garcia and his colleagues (Braverman & Bronstein, 1985; Garcia, Hankins, & Rusiniak, 1974). In perhaps the most famous of these studies, Garcia and Koelling (1966) allowed two groups of rats to sip saccharin-flavored water from a device that emitted a bright flashing light and a loud clicking noise (conditioned stimuli) whenever the rats licked the water. While both groups were drinking, one group of rats was exposed to X-rays that later made them sick (an unconditioned stimulus); the other group received painful shocks to their feet (an unconditioned stimulus). Traditional principles of classical conditioning suggest that *both* groups of rats should have learned to avoid all three stimuli—the flavored water, the bright light, and the clicking noise. After all, for both groups, these stimuli were followed by a strong unconditioned stimulus (either X-rays or a painful shock). But this was not what Garcia and Koelling found. Rats exposed to the painful shock learned to avoid the light and noise, but not the flavored water; rats that were made to feel ill learned to avoid the flavored water, but not the light or noise (see Figure 5.5 on page 184). In short, it seems that rats—and other organisms—are predisposed to associate nausea and dizziness with something they've consumed (the flavored water) and to associate pain with something they've seen or heard (the bright light and clicking noise). Similar findings from many different studies (e.g., Braverman & Bronstein, 1985) suggest that acquisition of a conditioned response does *not* occur with equal ease for different stimuli.

Another intriguing outcome that emerged from Garcia and Koelling's study is also noteworthy: Although the rats who received the X-rays did not get sick immediately, they still acquired an aversion to the flavored water. This finding contradicted the widely held belief that classical conditioning can occur only if the unconditioned stimulus follows the conditioned stimulus within a very short interval.

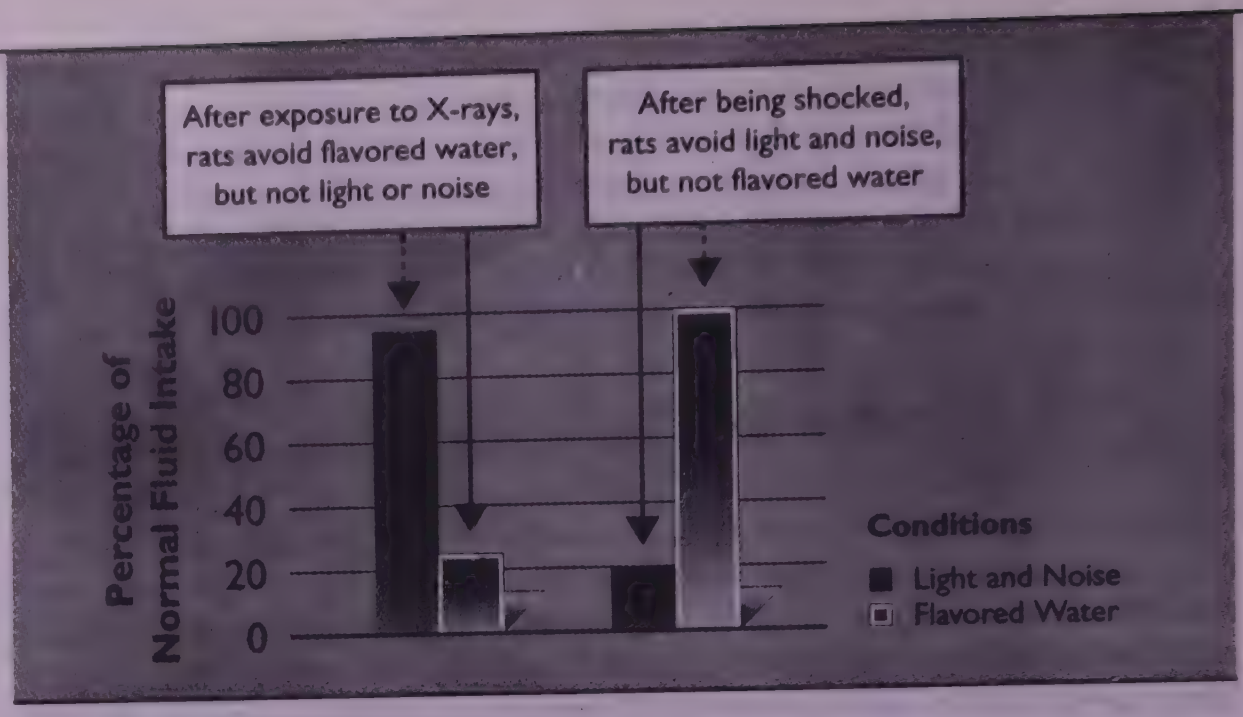
Key Points

- Learning is any relatively permanent change in behavior (or behavior potential) produced by experience.
- Classical conditioning is a form of learning in which neutral stimuli come to cause a response through their association with stimuli that naturally elicit a response.
- Acquisition of classically conditioned responses depends on many factors: temporal arrangement of the CS–UCS pairings, intensity of the CS and UCS relative to other background stimuli, and familiarity of potential conditioned stimuli present.
- A conditioned stimulus gradually ceases to elicit a conditioned response through extinction, but it can quickly regain this ability through reconditioning.
- Stimulus generalization allows us to apply our learning to other situations; stimulus discrimination allows us to differentiate among similar but different stimuli.
- Classical conditioning is not equally easy to establish with all stimuli for all organisms.
- Conditioned taste aversions can be established in one trial when a food or beverage (CS) is paired with a stimulus that naturally leads to feelings of illness (UCS).

FIGURE 5.5

Biological Constraints and Characteristics of the CS and UCS Affect the Acquisition of a Conditioned Response

Rats quickly acquired an aversion to a flavored water when it was followed by X-rays that made them ill, but they did *not* readily acquire an aversion to the flavored water when it was followed by an electric shock. In contrast, rats learned to avoid a light–noise combination when it was paired with shock, but not when it was followed by X-rays. These findings indicate that classical conditioning cannot be established with equal ease for all stimuli and for all organisms.
(*Source:* Based on data from Garcia & Koelling, 1966.)



Further research has also shown that in regard to conditioning, important differences exist among species. Because of these **biological constraints on learning**, types of conditioning readily accomplished by some species are only slowly acquired by others. And often, the types of conditioning most readily accomplished by one species are the very ones it needs to survive in its normal habitat (Shettleworth, 1993). For example, rats eat a varied diet and are most active at night. Thus, it is especially useful for them to be able to associate specific tastes with later illness, since in many cases they can't see the foods they eat. In contrast, birds depend heavily upon vision for finding food. For a bird it is more useful to be able to form associations between visual cues and later illness (Wilcoxon, Dragoin, & Kral, 1971).

One of the clearest demonstrations of an exception to the rules of traditional classical conditioning involves what is termed conditioned taste aversion. We'll explore this interesting aspect of learning in the **Point of It All** section below.

THE POINT OF IT ALL

Conditioned Taste Aversions: Breaking All the Rules?

Biological Constraints on Learning: *Tendencies of some species to acquire some forms of conditioning less readily than other species do.*

Conditioned Taste Aversion: *A type of conditioning in which the UCS (usually internal cues associated with nausea or vomiting) occurs several hours after the CS (often a novel food), leading to a strong CS–UCS association in a single trial.*

You are at a dinner party, and the host has prepared lasagna, a favorite dish you haven't tasted in ages. The first few bites are delicious, but as the meal progresses you begin to feel dreadful. For the next two days you have a fever and can't keep anything down. Months later you still experience the awful feelings whenever you see, smell, or even think about lasagna. You've developed a **conditioned taste aversion** to your formerly favorite dish.

Conditioned taste aversions are important for survival, because they inhibit the repeated ingestion of dangerous and toxic substances in animals' natural environment. And surveys show that food or beverage aversions are quite common among humans; most people report at least one such learned aversion (Logue, Ophir, & Strauss, 1981; Logue, Logue, & Strauss 1983). While many conditioned taste aversions result from overindulgence, some are established when we eat just before the onset of an illness like the flu (Garb & Stunkard,

1974). Interestingly, many people report that even though they are convinced that a particular food or beverage was not the cause of the illness that followed, they continue to experience a taste aversion to that substance. This evidence suggests that such aversions are unusually strong and can occur despite our thoughts about the cause of our illness (Seligman & Hager, 1972).

Research also shows that the way in which these powerful associations are established differs from most classical conditioning in several important respects. First, a conditioned taste aversion can usually be established with a single CS–UCS pairing, termed *one-trial learning*, in contrast to the many pairings involved in most Pavlovian conditioning. Second, conditioned taste aversions have been reported when the conditioned stimulus was presented hours before the occurrence of the unconditioned stimulus. In contrast, most instances of conditioning require a CS–UCS interval of not more than a few seconds. Finally, conditioned taste aversions are extremely resistant to extinction; some evidence suggests that they may last a lifetime (Garb & Stunkard, 1974; Logue, 1979).

Unfortunately, conditioned taste aversions can create serious problems for some individuals. For example, radiation and chemotherapy used to treat cancer often cause nausea or vomiting as a side effect (Burish & Carey, 1986). Thus, cancer patients may acquire taste aversions to foods ingested before therapy sessions. Several studies have in fact shown that conditioned taste aversions are common among patients receiving chemotherapy (Bernstein, 1978). These effects help explain the lack of appetite often reported by such patients.

Radiation and chemotherapy patients can take a number of steps to reduce the likelihood of developing a conditioned taste aversion. First, the strength of a conditioned response depends partly on the temporal relationship between the conditioned and the unconditioned stimulus. Thus patients receiving chemotherapy should arrange their meal schedules to decrease the chances of establishing an association between ingestion of the food and illness; the interval between their meals and chemotherapy should be as long as possible. Second, since in most classical conditioning, the strength of a conditioned response is directly related to novelty, patients should also eat familiar foods, avoiding novel or unusual foods before therapy. Because familiar foods have already been associated with feeling good, it is less likely that cancer patients will acquire an aversion for these foods. Finally, since the strength of a conditioned response is related to the intensity of the conditioned stimulus, patients should eat bland foods and avoid strongly flavored ones.

Understanding of acquired taste aversions has also been used to help Western ranchers solve a serious problem—the loss of sheep and cattle to predators such as wolves and coyotes (Garcia, Rusiniak & Brett, 1977; Gustavson et al., 1974). By establishing a conditioned taste aversion for cattle and sheep, ranchers have been able to save livestock without having to kill the predators. To create the taste aversion, ranchers lace small amounts of mutton or beef with lithium chloride, a substance that causes dizziness and nausea. The predators eat the bait, become sick several hours later, and, as a result, learn to avoid sheep or cattle.

The point of it all, then, is that a solid understanding of processes like learned taste aversion—a clear exception to traditional rules of classical conditioning—can be applied in solving important real-life problems.

LEARNED TASTE AVERSIONS: PUTTING CLASSICAL CONDITIONING TO WORK

Classical conditioning has been used to solve many practical problems, including saving ranchers' livestock from predators.

Classical Conditioning: A Cognitive Perspective

During his early conditioning experiments, Pavlov (1927) observed a curious thing. A dog was conditioned to the ticking of a metronome, which had been previously paired with the presentation of food. When the metronome was turned off, the dog sat in front of the machine and proceeded to whine and beg. Why? If conditioning involves only the development of an association between conditioned and unconditioned stimuli, then the dog should have responded only when the conditioned stimulus was presented. The fact that the dog appeared to beg for the ticking sound suggests that classical conditioning involves more than just association. In fact, this and several related findings point to the following conclusion: Regular pairing of a conditioned stimulus with an unconditioned stimulus provides subjects with valuable predictive information; it indicates that whenever a conditioned stimulus is presented, an unconditioned stimulus will shortly follow. Thus, as conditioning proceeds, subjects acquire the *expectation* that a conditioned stimulus will be followed by an unconditioned stimulus.

In this context, the dog's behavior is easy to understand. During conditioning, the dog learned that the ticking of the metronome signaled the delivery of food. Then, without any warning, this fickle machine stopped working. Obviously, something had to be done to get it started, so the dog acted on its expectancies: It whined and begged for the metronome to tick again. That cognitive processes involving expectation play a role in classical conditioning is a thesis supported by several types of evidence (Rescorla & Wagner, 1972). First, conditioning fails to occur when unconditioned and conditioned stimuli are paired in a random manner. With random pairings, subjects cannot acquire any firm expectation that an unconditioned stimulus will indeed follow presentation of a conditioned stimulus. Therefore, for conditioning to occur, the CS–UCS pairing must be consistent.

Second, the cognitive thesis is supported by a phenomenon known as *blocking*—the fact that conditioning to one stimulus may be prevented by previous conditioning to another stimulus. For example, suppose that a dog is initially conditioned to a tone. After repeated pairings with presentation of meat powder, the tone becomes a conditioned stimulus, capable of causing the dog to salivāte. Then a second stimulus, a light, is added to the situation. It too occurs just before the presentation of food. If classical conditioning occurs in an automatic manner, simply as a result of repeated pairings of a conditioned stimulus with an unconditioned stimulus, then the light too should become a conditioned stimulus: It should elicit salivation when presented alone. In fact, this does not happen. Why? Again, an explanation in terms of expectancies is helpful. Since the meat powder is already predicted by the tone, the light provides no new information. Therefore, it is of little predictive value to the subjects and fails to become a conditioned stimulus.

These findings suggest that classical conditioning involves much more than the formation of simple associations between specific stimuli. Indeed, modern views of conditioning conceive of it as a complex process in which organisms form rich representations of the relationships among a variety of factors—including many aspects of the physical setting or context in which the conditioned and unconditioned stimuli are presented (Rescorla, 1988; Swartzentruber, 1991).

I should add that this cognitive perspective on classical conditioning has also been extended to several of its basic aspects. For example, one theory of stimulus generalization suggests that memory and other cognitive processes play an important role (Pearce, 1986; Shettleworth, 1993). During conditioning, organ-

isms form a representation in memory of the stimuli that preceded the unconditioned stimulus. When they then encounter different stimuli at later times, they compare these with the information stored in memory. The greater the similarity between current stimuli and such memory representations, the stronger the response now evoked. In short, both memory and active comparison processes play a role in what might at first seem to be an automatic function.

The suggestion that cognitive processes are important in human classical conditioning is not surprising. After all, we all have expectancies about what events go together or are likely to follow one another. But it may surprise you to learn that processes like memory and active comparison also occur in animals. Although this possibility would have been unheard of even as recently as the 1970s, growing evidence suggests that animals, like humans, form mental representations of events in the world around them (Cook, 1993; Wasserman, 1993). We'll consider cognitive processes in greater detail in chapter 7.

Classical Conditioning: Turning Principles into Action

Much of the discussion in this chapter has focused on basic principles of classical conditioning, many of them derived from laboratory research involving animals. Before concluding, however, I should call attention to the fact that knowledge of these principles has been put to many practical uses to help people.

One of the earliest applications was reported in a study, now a classic in psychology, conducted by John B. Watson and his assistant, Rosalie Raynor, in 1920. Watson and Raynor (1920) demonstrated that human beings can sometimes acquire strong fears—termed **phobias**—through classical conditioning. In their study, an eleven-month-old child named Albert was shown a white laboratory rat. His initial reactions to the rat were positive: He smiled and attempted to play with it. Just as he reached out for the rat, though, an iron bar was struck to make a loud noise right behind his ear. Albert jumped, obviously very upset by the startling noise. After several more pairings of the rat (conditioned stimulus) and the loud noise (unconditioned stimulus), Albert cried hysterically and tried to crawl away whenever he saw the rat—even when it was not accompanied by the noise.

Fortunately, knowledge of how phobias like little Albert's occur has led to the development of several effective procedures for reducing these reactions (Davey, 1992). In one procedure, termed **flooding**, a person suffering from a specific fear may be forced to confront the fear-eliciting stimulus without an avenue of escape (Gordon, 1989; Morganstern, 1973). For example, a therapist may persuade a person who has an irrational fear of heights to walk onto a high bridge and may keep the person there for a while—under careful supervision, of course. Because no harm results from this experience, the person may eventually become less fearful of heights. In cases where fear-provoking thoughts are too painful to deal with directly, *systematic desensitization*—a progressive technique designed to replace anxiety with a relaxation response—has proven effective (Wolpe, 1958; 1969). A person undergoing this procedure is asked to describe fearful situations. Then, starting with the least anxiety-producing situation, the person alternately visualizes situations and relaxes. Gradually, the individual learns to relax while imagining situations that are increasingly more threatening. Chapter 15 will discuss these procedures in more detail.

Knowledge of conditioning processes has also led to another intriguing application. Research evidence suggests that some instances of drug overdose can be explained, at least in part, through aspects of classical conditioning. For

***Phobias**: Intense, irrational fears of objects or events.*

***Flooding**: Procedure for eliminating conditioned fears based on principles of classical conditioning. During flooding an individual is exposed to fear-inducing objects or events. Since no unconditioned stimulus then follows, extinction of fears eventually takes place.*

Classical Conditioning: A Human Example

John B. Watson and his graduate assistant Rosalie Raynor used classical conditioning to teach "Little Albert" to fear various small, furry objects. What ethical problems were involved in these studies?

example, it is well known that certain drugs become less effective over time. But why does this occur? One possibility is that when a person uses drugs in a particular context, the stimuli in that environment become conditioned stimuli and come to elicit a conditioned response (Siegel, 1983, 1984). Interestingly, for certain addictive drugs, this conditioned response can be just the opposite of the unconditioned response. With morphine, for example, although the unconditioned response is a decreased sensitivity to pain, the conditioned response to a conditioned stimulus associated with the drug is increased sensitivity to pain (Siegel, 1975). Apparently, these conditioned stimuli signal the body to prepare for morphine by suppressing the response to it (Chance, 1988). An experiment conducted by Siegel and his colleagues (Siegel, Hinson, Krank, & McCully, 1982) supported this theory. In the study, rats received injections of either heroin or placebo on alternating days, in alternating environments. Then all subjects received a single high—potentially fatal—dose of heroin. One group received this dose in the heroin environment, the other group in the placebo environment. A control group that had previously received only placebo were also injected with the high dose of heroin. The results? First, more subjects with previous drug experience survived than control group subjects; apparently, tolerance resulted from the early nonlethal injections (please refer to Figure 5.6). Second, and more interesting, mortality differed between the other two groups: Mortality was highest among those receiving the injection in the environment previously associated with the placebo—*not* heroin. These results suggest that cues associated with the heroin environment served as conditioned stimuli and prepared the rats' bodies partially to counteract the effects of the lethal injection; the placebo environment did not provide such cues. Indeed, drug users who have nearly died following drug use commonly report something unusual about the environment in which they took the drug (Siegel, 1984). Often these environmental differences are quite subtle, a fact that emphasizes the powerful effects produced by conditioning.

These results may also have implications for drug treatment. Recent evidence has shown that the environments to which former drug users return often contain cues that may produce drug-related conditioned responses, such as withdrawal symptoms and drug cravings (Ehrman et al., 1992). Knowledge of classical conditioning processes may help

Key Points

- Modern views of classical conditioning emphasize the important role of cognitive processes.
- In blocking, conditioning to one stimulus is prevented by previous conditioning to another stimulus.
- In flooding, a person is forced to come into contact with fear-eliciting stimuli without an avenue of escape. Cases in which fearful thoughts are too painful to deal with directly are treated by systematic desensitization—a progressive technique designed to replace anxiety with a relaxation response.
- Basic principles of classical conditioning can be used to increase our understanding of phobias and drug overdoses.

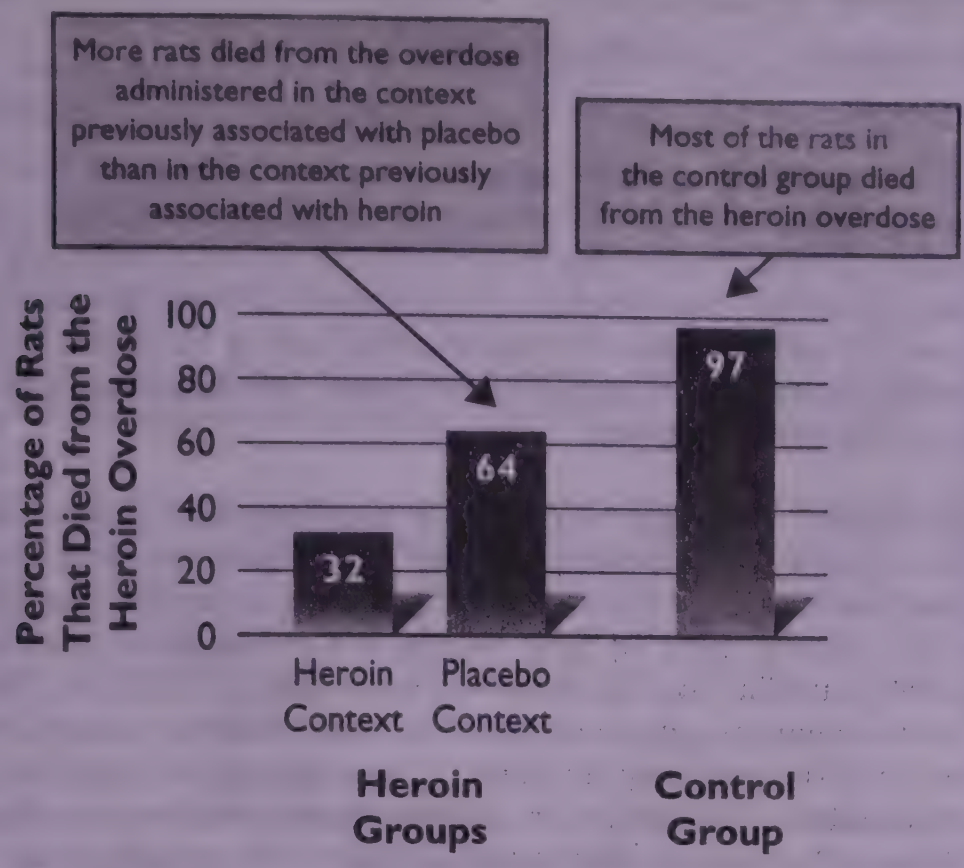


FIGURE 5.6

Classical Conditioning Can Help Explain Deaths Following Drug Overdose

The results of this study led to two conclusions: (1) Control group subjects—those with no previous experience with heroin—were more likely to die after receiving a potentially lethal dose of heroin than subjects with previous drug experience. (2) Subjects who received the potentially lethal dose of heroin in an environment previously associated with heroin injections were more likely to survive than those who received the same injection in an environment previously associated with a placebo. (*Source:* Based on data from Siegel, Hinson, Krank & McCully, 1982.)

health professionals arrange environments that minimize relapse among former drug users—by eliminating the cues that trigger conditioned responses.

OPERANT CONDITIONING: Learning Based on Consequences

It was the first day of school, and Jeff was already off to a bad start. Barely there an hour, he had already landed himself in the principal's office. Before starting the first grade, Jeff had always gotten his way. Although they knew it was wrong, his parents eventually gave into his demands because of the tantrums Jeff was sure to throw if they did not. Now Jeff's behavior had become unbearable—even in school.

Much to Jeff's surprise, however, his teacher did not react to his misbehaviors as he expected. In fact, each time Jeff misbehaved, he received "time out"—a few minutes in a quiet corner of the room, away from his classmates. At first Jeff tried his usual routine: He kicked and screamed all the way to the corner. After all, this strategy always worked at home. The teacher's reaction to these outbursts, however, remained consistent, despite the fact that Jeff's tantrums initially worsened. Interestingly, Jeff's outbursts seemed to lose some of their steam as the weeks went by. Jeff also began to notice that on days when he was well behaved, the teacher smiled at him more and rewarded his good behavior with cartoon stickers or special jobs, such as passing out papers. After just a few weeks, Jeff's outbursts disappeared completely.

What happened here? The answer is probably obvious: Jeff's behaviors changed consistent with the nature of the consequences they produced. Behaviors that produced positive consequences increased in frequency, whereas those that were ignored or resulted in time out decreased. In short, the teacher had used *operant* (or *instrumental*) *conditioning* to change Jeff's behavior.

USING REINFORCEMENT ON THE FOOTBALL FIELD

Some college football teams use helmet stickers to reward good plays. According to the principles of operant conditioning, if the stickers increase the probability that the desired action occurs again, they are functioning as positive reinforcers. What positive reinforcers do you respond to?

THE NATURE OF OPERANT CONDITIONING: Consequential Operations

In situations involving **operant conditioning**, the probability that a given response will occur changes depending on the consequences that follow it. Psychologists generally agree that these probabilities are determined through four basic procedures, two of which strengthen or increase the rate of behavior and two of which weaken or decrease the rate of behavior. Procedures that *strengthen* behavior are termed *reinforcement*, whereas those that *suppress* behavior are termed *punishment*.

REINFORCEMENTS There are two types of **reinforcement**: positive reinforcement and negative reinforcement. *Positive reinforcement* involves the impact of **positive reinforcers**—stimulus events or consequences that strengthen responses that precede them. In other words, if a consequence of some action increases the probability that the action will occur again in the future, that consequence is functioning as a positive reinforcer. Some positive reinforcers seem to exert these effects because they are related to basic biological needs. Such *primary reinforcers* include food when we are hungry, water when we are thirsty, and sexual pleasure. In contrast, other events acquire their capacity to act as positive reinforcers through association with primary reinforcers. Among such *conditioned reinforcers* are money, status, grades, trophies, and praise from others.

Preferred activities can also be used to reinforce behavior, a principle referred to as the **Premack principle**. If you recall hearing "You must clean your room before you can watch TV" when you were growing up, then you're already familiar with this principle. Jeff's teacher could use the Premack principle to reinforce a *less* preferred behavior—like doing school work or behaving appropriately—with a *more* preferred activity, such as playing outside during recess. As you can guess, the Premack principle is a powerful tool for changing behavior.

Please note that a stimulus event that functions as a positive reinforcer at one time or in one context may have a different effect at another time or in another place. For example, food may serve as a positive reinforcer when you are hungry, but not when you are ill or just after you finish a large meal. Also, at least where people are concerned, many individual differences exist. Clearly, a stimulus that functions as a positive reinforcer for one person may fail to operate in a similar manner for another person. We will return to this important point later on in this chapter.

Negative reinforcement involves the impact of **negative reinforcers**—stimuli that strengthen responses that permit an organism to avoid or escape from their presence. Thus, when we perform an action that allows us to escape from a negative reinforcer that is already present or to avoid the threatened application of one, our tendency to perform this action in the future increases. Some negative reinforcers, such as intense heat, extreme cold, or electric shock, exert their effects the first time they are encountered, whereas others acquire their impact through repeated association.

There are many examples of negative reinforcement in our everyday lives. For example, imagine the following scene. On a particularly cold and dark winter morning, you're sleeping soundly in a warm, comfortable bed. Suddenly, the "alarm clock from hell" begins to wail from across the room. Although getting out of your cozy bed is the last thing on your mind, you find the noise intolerable. What do you do? If you get up to turn off the alarm—or, on subsequent mornings, get up early to avoid hearing the sound

Operant Conditioning: *A process through which organisms learn to repeat behaviors that yield positive outcomes or permit them to avoid or escape from negative outcomes.*

Reinforcement: *The application or removal of a stimulus to increase the strength of a behavior.*

Positive Reinforcers: *Stimuli that strengthen responses that precede them.*

Premack Principle: *The principle that a more preferred activity can be used to reinforce a less preferred activity.*

Negative Reinforcers: *Stimuli that strengthen responses that permit an organism to avoid or escape from their presence.*

of the alarm altogether—your behavior has been *negatively* reinforced. In other words, your tendency to perform actions that allowed you to escape from or avoid the sound of the alarm clock has increased. Another everyday example of negative reinforcement occurs when parents give in to their children's tantrums—especially in public places, such as restaurants and shopping malls. Over time, the parent's tendency to give in may increase, because doing so stops the screaming. A final example of negative reinforcement can be seen every April 15 in the United States, when millions of citizens rush to mail their tax forms to avoid the even more unpleasant consequences that will follow if they miss this deadline.

To repeat, then, both positive and negative reinforcement are procedures that strengthen or increase behavior. Positive reinforcers are stimulus events that strengthen responses that precede them, whereas negative reinforcers are aversive stimulus events that strengthen responses that lead to their termination or avoidance.

THE PREMACK PRINCIPLE: A POWERFUL BEHAVIOR CHANGE TECHNIQUE

The Premack principle is a powerful tool to encourage desired behaviors—including eating one's veggies!

PUNISHMENT AND OMISSION TRAINING In contrast to reinforcement, *punishment* and *omission training* are procedures that weaken or decrease the rate of behavior. In **punishment**, behaviors are followed by aversive stimulus events termed *punishers*. In such instances, we learn not to perform these actions since aversive consequences—punishers—will follow. And this highlights a point about which there is often much confusion.

Contrary to what common sense seems to suggest, punishment is not the same as negative reinforcement. Here is an example to illustrate the difference. Imagine that you are driving home in a hurry, exceeding the speed limit. A sick sensation creeps into your stomach as you become aware of flashing lights and a siren. A state trooper has detected your speeding. Your eyes bug out when you see how much the ticket will cost you; and after paying that fine, you obey the posted speed limit. This is an example of the impact of *punishment*—an unpleasant outcome follows your speeding, so the chances that you will speed in the future decrease. Now imagine that a year later you are again caught speeding. Apparently the punishment suppressed your speeding behavior only temporarily. Because you are a past offender, the judge handling your case gives you an interesting choice: either attend a month-long series of driver education classes or lose your driver's license. In order to avoid losing your license, you attend every class. This is an example of *negative reinforcement:* You attend the driver education classes to *avoid* an aversive event—the loss of your license. The **Key Concept** feature on page 192 summarizes the difference between negative reinforcement and punishment.

Omission training is the term used to describe the weakening of a response through the removal of something pleasurable. For example, parents frequently attempt to combat certain behaviors of their teenagers by removing their privileges, like access to the family car for weekend dates. Thus, both punishment and omission training are procedures that weaken or decrease behavior. Table 5.1 (on page 193) summarizes positive reinforcement, negative reinforcement, punishment, and omission training.

KEY POINTS

- In operant conditioning, organisms learn the relationships between certain behaviors and the consequences they produce.
- Both positive and negative reinforcement strengthen or increase behavior. Punishment and omission training aim to weaken or suppress behavior.
- Primary reinforcers include food, water, and sexual pleasure. Conditioned reinforcers include money, status, and praise.
- The Premack principle suggests that preferred activities can be used to reinforce less preferred activities.

Punishment: *The application or removal of a stimulus so as to decrease the strength of a behavior.*

Omission Training: *A procedure in which a response is weakened through the removal of a desired object or activity.*

KEY CONCEPT

The Difference between Negative Reinforcement and Punishment

Negative reinforcement and punishment are definitely *not* the same. In fact, one of the few similarities between them is that both involve an aversive stimulus. The examples here illustrate ways in which negative reinforcement and punishment differ.

Negative Reinforcement

- Negative reinforcement *motivates* behavior—organisms perform behaviors that allow them to *escape* or *avoid* aversive stimuli.
- In negative reinforcement, aversive stimuli *precede* the escape or avoidance response.

We may take aspirin to alleviate the pain of a headache. This is escape behavior.

Escape Behavior

Organisms engage in behaviors that allow them to escape or terminate an unpleasant or aversive event that has already occurred.

We may use sunscreen to avoid getting a painful sunburn. This is avoidance behavior.

Avoidance Behavior

Sometimes, events in our environment reliably signal an impending aversive event. These stimuli provide us with advance warning and motivate behavior that allows us to avoid experiencing the aversive event altogether.

Punishment

- Punishment decreases or suppresses behavior—organisms stop doing behaviors that produce aversive consequences.
- In punishment, an aversive stimulus *follows* a response and decreases the chances the response will occur in the future.

With punishment, a behavior is followed by an aversive stimulus (such as spanking) to decrease the likelihood that the behavior occurs again. The use of punishment is controversial, however. Its opponents contend that the target behavior is not eliminated but merely suppressed, and that it may reappear in situations in which punishment is not a threat. In addition, many psychologists believe that the use of punishment may increase aggression, especially in children.

Procedure	Stimulus Event	Effects	Behavioral Outcomes
Positive reinforcement	Application of desirable (appetitive) stimulus (e.g., food, sexual pleasure, praise)	Strengthens responses that precede occurrence of stimulus	Organisms learn to perform responses that produce positive reinforcers
Negative reinforcement	Removal or postponement of undesirable (aversive) stimulus (e.g., heat, cold, harsh criticism)	Strengthens responses that permit escape from or avoidance of stimulus	Organisms learn to perform responses that permit them to avoid or escape from negative reinforcers
Punishment	Application of undesirable (aversive) stimulus	Weakens responses that precede occurrence of stimulus	Organisms learn to suppress responses that lead to unpleasant consequences
Omission training	Removal of desirable (appetitive) stimulus	Weakens responses that precede occurrence of stimulus	Organisms learn to suppress responses that lead to the removal of pleasant consequences

TABLE 5.1

Positive Reinforcement, Negative Reinforcement, Punishment, and Omission Training: An Overview

Positive and negative reinforcement are both procedures that strengthen behavior. Punishment and omission training are procedures that weaken behavior.

Operant Conditioning: Some Basic Principles

In classical conditioning, organisms learn associations between stimuli: Certain stimulus events predict the occurrence of others that naturally trigger a specific response. In addition, the responses performed are generally *involuntary*. In other words, they are *elicited*—pulled out of the organism—by a specific unconditioned stimulus in an automatic manner; for example, salivation to the taste of food, blinking the eyes in response to a puff of air.

In operant conditioning, in contrast, organisms learn associations between particular *behaviors* and the consequences that follow them. Additionally, the responses involved in operant conditioning are more voluntary and are *emitted* by organisms in a given environment. In order to understand the nature of this form of conditioning, then, we must address two basic questions: (1) Why are certain behaviors emitted in the first place? (2) Once they occur, what factors determine the frequency with which they are repeated?

Shaping and Chaining: Getting Behavior Started and Then Putting It All Together In order to study operant conditioning under laboratory conditions, psychologists often use two basic types of apparatus. The first is a maze, or runway. Here, subjects (usually rats) must learn which ways to turn in order to receive some reward, usually food, at the end of the maze. Since making correct responses yields a rewarding consequence, the speed and accuracy of such responses usually increases over successive trials.

The second type of equipment is known as a *Skinner box*, after its originator, B. F. Skinner. Skinner is a major figure in the history of psychology, well known both for his research and his outspoken support of a behavioristic viewpoint that he termed the *experimental analysis of behavior*. We will consider his substantial contributions to psychology at several points in this chapter. Animals (usually rats or pigeons) in a Skinner box must press a lever or peck a key in order to obtain small pellets of food. Since this is the only response that yields reinforcement, it quickly increases in frequency, and subjects may spend long periods of time working for their reward. A device called a cumulative recorder, developed by Skinner, registers each response

B. F. Skinner with His Skinner Box

Animals in the Skinner box learn to press a lever or peck a key in order to obtain small pellets of food. The animals' responses are recorded by a device called a *cumulative recorder*.

at the time it occurs and so provides a permanent record of how the rate of a particular response, whether pecks or presses, changes over time. Although technologically simple by today's standards, Skinner's tools allowed him to observe systematically the relationship between simple responses and the consequences they produced, thus leading to the discovery of important principles that we'll consider later in this discussion.

The responses that occur in mazes and Skinner boxes are both simple and natural for the organisms involved; rats often run through tunnels and pecking is common among pigeons. But how can behaviors that organisms *don't* spontaneously emit be established? The answer involves a procedure known as shaping, which was first systematically studied by Skinner. In essence, **shaping** is based on the principle that a little can eventually go a long way. Subjects receive a reward for each small step toward a final goal—the target response—rather than only for the final response. At first, actions even remotely resembling the target behavior—termed *successive approximations*—are followed by a reward. Gradually, closer and closer approximations of the final target behavior are required before the reward is given. This sounds simple, but does it actually work? Absolutely. For example, when a baby suddenly blurts out the sound "Mmmuuhh," the parents are ecstatic: They immediately lavish attention and affection on the child and do so each time the baby repeats the sound; all the baby's other relatives do the same. But what happens over time? Although initially the family responds enthusiastically to any sound the child makes, gradually they respond only to sounds that approximate actual words. Shaping, then, helps organisms acquire, or construct, new and more complex forms of behavior from simpler behavior.

What about even more complex sequences of behavior, such as the exciting water routines performed by dolphins and killer whales at Sea World? These behaviors can be cultivated by a procedure called **chaining**, in which trainers establish a sequence, or chain, of responses, the last of which leads to a reward. Trainers usually begin chaining by first shaping the final response. When this response is well established, the trainer shapes responses earlier in the chain, then reinforces them by giving the animal the opportunity to perform responses later in the chain, the last of which produces the reinforcer.

Shaping and chaining have important implications for human behavior. For example, when working with a beginning student, a skilled dance teacher or ski instructor may use shaping techniques to establish basic skills, such as performing a basic step or standing on the skis without falling down, by praising simple accomplishments. As training progresses, however, the student may receive praise only when he or she successfully completes an entire sequence or chain of actions, such as skiing down a small slope.

Shaping and chaining techniques can produce dramatic effects. But can they be used to establish virtually any form of behavior in any organism? If you recall our earlier discussion of biological constraints on classical conditioning, you can probably guess the answer: no. Just as there are biological constraints on classical conditioning, there are constraints on forms of learning based on consequences, or shaping. Perhaps this is most clearly illustrated by the experience of two psychologists, Keller and Marian Breland (1961), who attempted to put their expertise in techniques of operant conditioning to commercial use by training animals to perform unusual tricks and exhibiting them at state fairs. At first, things went well. Using standard shaping techniques, the Brelands trained chickens to roll plastic capsules holding prizes down a ramp and then peck them into the hands of waiting customers; they taught pigs to deposit silver dollars into a piggy bank. As time went by, though, these star performers gradually developed some unexpected responses. The chickens began to seize the capsules and pound them against

***Shaping**: A technique in which closer and closer approximations of desired behavior are required for the delivery of positive reinforcement.*

***Chaining**: A procedure that establishes a sequence of responses, which lead to a reward following the final response in the chain.*

the floor, and the pigs began to throw coins onto the ground and root them about instead of making "deposits" in their bank. In short, despite careful training, the animals showed what the Brelands termed *instinctive drift*—a tendency to return to the type of behavior they would show under natural conditions. So operant conditioning, like classical conditioning, is subject to biological constraints. While the power of positive and negative reinforcers is great, natural tendencies are important, too, and can influence the course and results of operant conditioning in many cases.

The Size of Reinforcement and Delay: Bigger or Smaller, Sooner or Later Operant conditioning usually proceeds faster as the *magnitude* of the reward that follows each response increases. But does this mean the absolute size of each reward or does it mean the number of rewards received? One study shows that if two groups of rats receive the same absolute amount of reward for each response, but one group receives this amount in a greater number of smaller pieces, the group receiving more pieces will respond faster (Campbell, Batsche, & Batsche, 1972). This suggests that the rats prefer to receive smaller, more numerous rewards rather than larger, fewer ones.

Reward delay also affects operant conditioning, with longer delays producing poorer levels of performance. A study by Capaldi (1978), for example, examined how reward delay affected running behavior in two groups of rats. Although both groups received the same amount and quality of food on each trial, one group received the reward immediately and the other group received it after a ten-second delay. As you might guess, subjects in the immediate-reward group performed better than subjects in the delayed-reward group.

The effects of reward delay are also evident in humans. For example, children will often choose smaller, immediate rewards over rewards of greater value that they must wait to receive. Adults, too, often choose immediate rewards, even if the delayed consequences for doing so are aversive. Smokers, for instance, choose the immediate pleasures they derive from smoking over the potentially negative consequences they may suffer later on, such as cancer. Alcoholic beverages can also affect the way in which we evaluate short-term versus delayed consequences (Steele & Josephs, 1990). For example, drinking too much the night before an exam may reduce the influence of inhibiting cues associated with long-term consequences, such as failing the next day's test, and may increase the influence of environmental cues associated with short-term consequences, such as friends or good music.

Schedules of Reinforcement: Different Rules for Delivery of Payoffs Through experience, you may already realize that under natural conditions reinforcement is often an uncertain event. Sometimes a given response yields a reward every time it occurs, but sometimes it does not. For example, smiling at someone you don't know may produce a return smile and additional positive outcomes. On other occasions it may be followed by a suspicious frown or other rejection. Similarly, putting a coin in a soda machine usually produces a soft drink. Sometimes, though, you merely lose the money.

In these cases, the occurrence or nonoccurrence of reinforcement seems to be random or unpredictable. In many other instances, though, it is governed by rules. For example, paychecks are delivered on certain days of the month; free pizzas or car washes are provided to customers who have purchased a specific amount of products or services. Do such rules—known as **schedules of reinforcement**—affect behavior? Several decades of research by Skinner and other psychologists suggest that they do. Many different types of schedules of reinforcement exist (Ferster & Skinner, 1957; Honig & Staddon, 1977). We'll concentrate on several of the most important ones here.

Shaping and Chaining

The dual processes of shaping and chaining help explain the development of complex behaviors in animals, including these water-skiing squirrels.

Schedules of Reinforcement: *Rules determining when and how reinforcements will be delivered.*

SCHEDULES OF REINFORCEMENT AT WORK

Migrant workers are paid on a fixed-ratio schedule. Because each worker's pay depends on the amount of produce picked, this type of schedule generally yields a high rate of response. Which type of payment schedule would you prefer?

The simplest is called the **continuous reinforcement schedule** (CRF), in which every occurrence of a particular behavior is reinforced. For example, if a rat receives a food pellet each time it presses a lever, or a small child receives twenty-five cents each time he ties his shoes correctly, both are on a continuous reinforcement schedule. As you might imagine, continuous reinforcement is useful for establishing or strengthening new behaviors.

Other types of schedules, however, termed *partial* or *intermittent reinforcement*, are often more powerful in maintaining behavior. In the first of these, known as a **fixed-interval schedule**, the occurrence of reinforcement depends on the passage of time; the first response made after a specific period has elapsed brings the reward. When placed on schedules of this type, people generally show a pattern in which they respond at low rates immediately after delivery of a reinforcement, but then gradually respond more and more as the time when the next reward can be obtained approaches. A good example of behavior on a fixed-interval schedule is provided by students studying. After a big exam, little if any studying takes place. As the time for the next test approaches, the rate of such behavior increases dramatically.

Reinforcement is also controlled mainly by the passage of time in a **variable-interval schedule**. Here, though, the period that must elapse before a response will again yield reinforcement varies around some average value. An example of behavior on a variable-interval schedule of reinforcement is provided by employees whose supervisor checks their work at irregular intervals. Since the employees never know when such checks will occur, they must perform in a consistent manner in order to obtain positive outcomes, such as praise, or avoid negative ones, such as criticism. This is precisely what happens on variable-interval schedules: Organisms respond at a steady rate without the kind of pauses observed on fixed-interval schedules. An important procedure that is arranged according to a variable-interval schedule is random drug testing of individuals in safety-sensitive jobs—people whose impaired performance could endanger the lives of others, such as airline pilots or operators at nuclear reactor sites. Because they cannot predict the day on which the next test will occur, these individuals may be more likely to refrain from using drugs that could impair their on-the-job performance.

Reinforcement is determined in a very different manner on a **fixed-ratio schedule**. Here, reinforcement occurs only after a fixed number of responses. Individuals who are paid on a piecework basis, in which a fixed amount is paid for each item produced, are operating according to a fixed-ratio schedule. Generally, such schedules yield a high rate of response, though with a tendency toward a brief pause immediately after each reinforcement. The pauses occur because individuals take a slight breather after earning each unit of reinforcement. People who collect bottles, cans, and other recyclable materials for the money they bring are behaving according to a fixed-ratio schedule.

Finally, on a **variable-ratio schedule**, reinforcement occurs after completion of a variable number of responses. Since organisms confronted with a variable-ratio schedule cannot predict how many responses are required before reinforcement will occur, they usually respond at high and steady rates. The effect of such schedules on human behavior is readily apparent in gambling casinos, where high rates of responding occur in front of slot machines and other games of chance.

Variable-ratio schedules also result in behaviors that are highly resistant to extinction—ones that persist even when

KEY POINTS

- Shaping involves reinforcing successive approximations of the final desired behavior.
- Chaining involves teaching a complex sequence of behaviors, by first shaping the final response in the sequence, then working backwards until a chain of behaviors is learned.
- Schedules of reinforcement are rules that determine the occasion on which a response will be reinforced. Schedules of reinforcement can be time-based or event-based, fixed or variable.
- A continuous reinforcement schedule is desirable for establishing new behaviors; partial or intermittent schedules of reinforcement are more powerful in maintaining behavior.

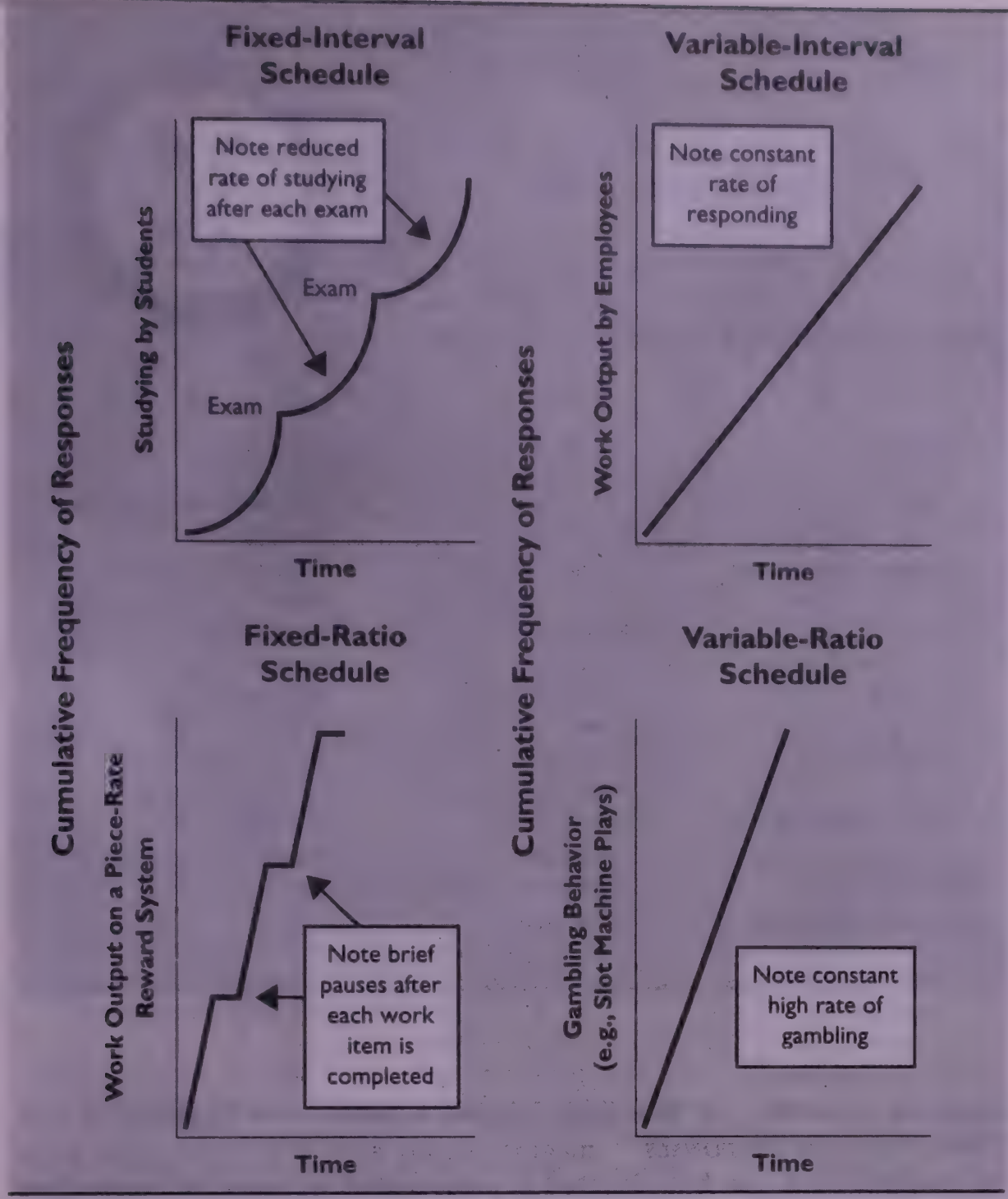


FIGURE 5.7

Schedules of Reinforcement: A Summary of Their Effects

Rates of responding vary under different schedules of reinforcement. The steeper each line in the graph, the higher the rate at which responses are performed.

reinforcement is no longer available. In fact, resistance to extinction is much higher after exposure to a variable-ratio schedule of reinforcement than it is after exposure to a continuous reinforcement schedule. This phenomenon is known as the *partial reinforcement effect* and seems to occur for the following reason. Under a variable-ratio schedule, many responses are not followed by reinforcement. Many golfers are well acquainted with the partial reinforcement effect; for each great shot they hit, they hit many more poor ones, yet they continue to play the game. Suppose that a golfer fails to hit even one good shot over the course of an entire season—will she continue to play? The chances are good that she will. When reinforcement is infrequent and intermittent in its delivery, people or other organisms may continue to respond because it is difficult for them to recognize that reinforcement is no longer available. In short, they fail to realize that no amount of responding will do any good (Mowrer & Jones 1945).

As summarized in Figure 5.7 and evident throughout the preceding discussion, different schedules of reinforcement produce distinct patterns of responding. Each schedule helps describe how the delivery of consequences affects our behavior. However, consequences are not the only determinants of behavior. Stimuli that precede our behavior and signal the availability of certain consequences are also important.

Continuous Reinforcement Schedule: *A schedule of reinforcement in which every occurrence of a particular behavior is reinforced.*

Fixed-Interval Schedule: *A schedule of reinforcement in which a specific interval of time must elapse before a response will yield reinforcement.*

Variable-Interval Schedule: *A schedule of reinforcement in which a variable amount of time must elapse before a response will yield reinforcement.*

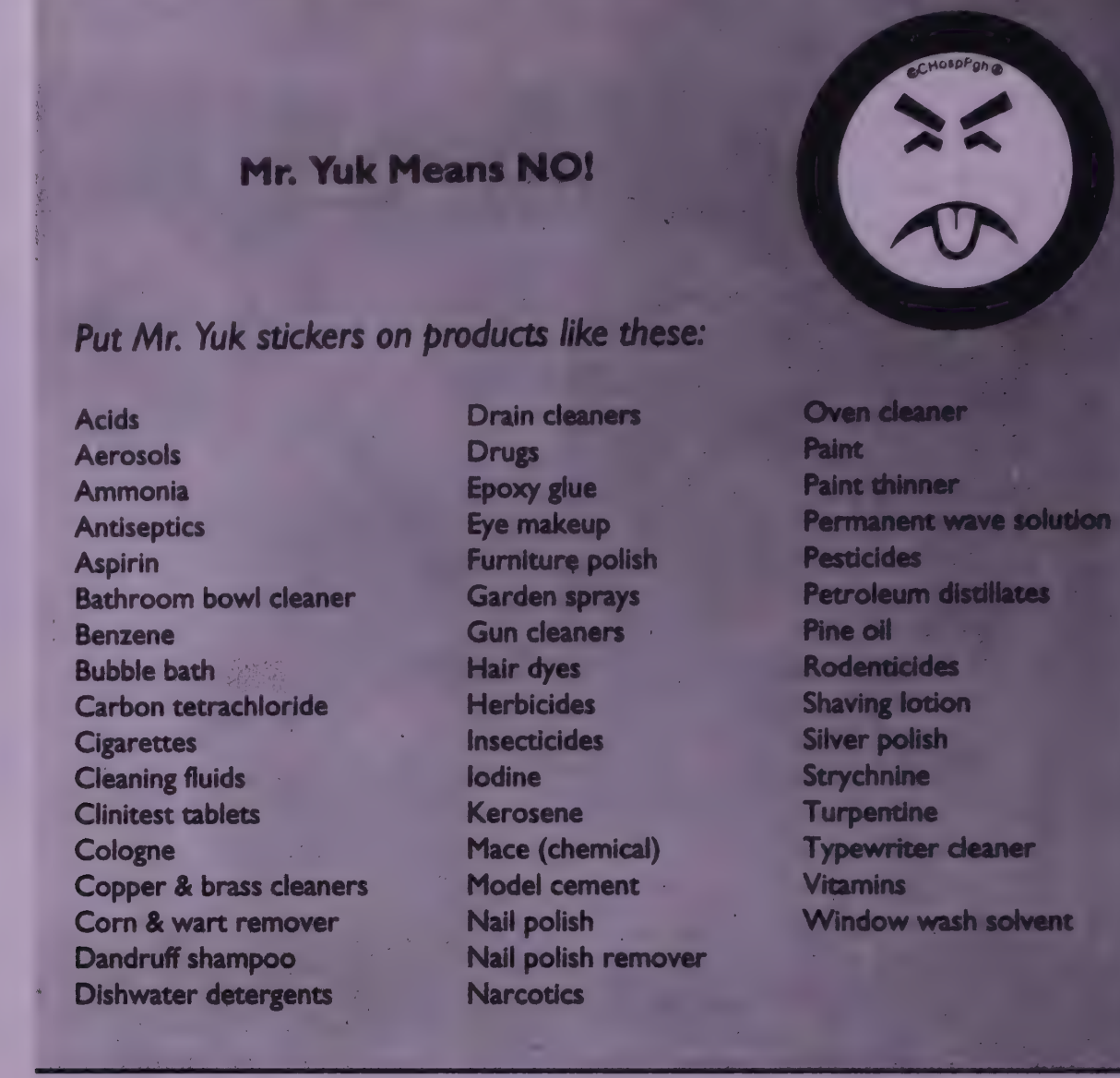
Fixed-Ratio Schedule: *A schedule of reinforcement in which reinforcement occurs only after a fixed number of responses have been emitted.*

Variable-Ratio Schedule: *A schedule of reinforcement in which reinforcement is delivered after a variable number of responses have been performed.*

FIGURE 5.8

Applying Stimulus Control to Prevent Accidental Poisonings

Stimulus control can be applied to solve important problems of everyday life—in this case, preventing accidental poisonings among very small children.
(*Source*: Permission to use Mr. Yuk symbol given by Children's Hospital of Pittsburgh.)



Stimulus Control of Behavior: Signals about the Usefulness (or Uselessness) of Responses Imagine you are a rat in a Skinner box. Over the past few days, you have learned to press a lever in order to receive food pellets. One morning you notice the presence of a light in the box that is turned on and off with some regularity. The light is actually a signal: You will be rewarded with food if you press the lever when the light is on, but not when the light is off. Over time, you learn to press the lever in the presence of the light—termed a **discriminative stimulus**—but not when the light is turned off. In short, your lever-pressing behavior has come under **stimulus control** of the light: You are obeying the light's signal as to whether lever pressing should be performed or omitted (Skinner, 1938).

Stimulus control has important implications for people, too. For example, one type of graphic discriminative stimulus, the *Mr. Yuk* sticker, has been used to prevent accidental poisonings among small children who can't yet read warning labels or understand the dangers of many household products (please refer to Figure 5.8). How do Mr. Yuk stickers work? Initially parents place the stickers on all poisonous products in their home and explain to their children that Mr. Yuk means "No, don't touch." Then, each time a child attempts to handle a product containing the sticker, he or she receives a scolding. Soon Mr. Yuk comes to signal the availability of unpleasant consequences, and children quickly learn to avoid products with Mr. Yuk stickers. In short, stimulus control has important implications for solving a variety of problems in everyday life. We'll consider additional ways in which psychologists have applied the concept of stimulus control in the following **Research Process** section.

Discriminative Stimulus: *Stimulus that signals the availability of reinforcement if a specific response is made.*

Stimulus Control: *Consistent occurrence of a behavior in the presence of a discriminative stimulus.*

Stimulus Control in Action: Promoting Paper Waste Recycling on a University Campus

As we've already seen, B. F. Skinner was a major proponent of the importance of operant conditioning. In Skinner's view, learning results from the interaction between an organism's behavior and the environment in which it behaves. He suggested that a complete understanding of the environment-behavior interaction requires knowledge of three important concepts: (1) characteristics of stimulus events that precede a particular response, or *antecedents;* (2) characteristics of the response or behavior itself, and (3) the reinforcing consequences that maintain the response (Skinner, 1969). Skinner's development of this *three-term contingency* led to an explosion of research, and behavioral researchers have developed a broad range of conditioning techniques to promote beneficial behavior change, from improving the performance of children at school to getting people to buckle their automobile safety belts to promoting recycling.

A majority of the research on recycling has focused on manipulating consequences for this behavior. Recently, however, psychologists have broadened their focus to include the control of antecedent stimuli—in other words, to make recycling easy (Austin et al., 1993; Geller, Winett, & Everett, 1982).

Why is getting people to recycle so important? One reason is that increased recycling will mean less demand on the natural resources necessary to produce new paper containers and packaging materials. Perhaps more importantly, available landfill space is rapidly shrinking. Many landfills in the United States will reach capacity in the 1990s, and only a few new ones will be opened to replace them (Environmental Protection Agency, 1990). The United States currently recycles only a fraction of its solid wastes—but the good news is that there is a great deal of room for improvement.

Reluctance on the part of American consumers to recycle is due, at least in part, to the availability of disposable products. Manufacturers make it easier for people to throw empty containers in the trash than to recycle them. To counteract this trend, many states have passed legislation requiring manufacturers to produce recyclable bottles and cans: We pay a deposit when we buy the product and get the deposit back only when we return the empty container. This practice has dramatically increased recycling—at least for beverage containers.

At this point you may be saying: "Aha! So the answer is to *pay* people to recycle, right?" Unfortunately, although this practice works splendidly for beverage containers, it does not address other important recycling problems, such as office paper. The proliferation of laser printers and photocopy machines has dramatically increased the amount of paper entering landfills. In fact, paper makes up nearly 40 percent of the solid waste produced in the United States each year. Although most forms of office paper can readily be turned into other useful paper products, it is nearly impossible to offer individual rewards for people's efforts to recycle paper. Thus, most office paper ends up in the trash. How can we solve this problem? Psychologists have recently used their knowledge of Skinner's three-term contingency to address this issue. Specifically, they have explored the possibility of arranging aspects of the environment to *support* recycling behavior.

Can we really get people to recycle in this way? Several recent studies suggest that we can (Austin et al., 1993; Dwyer et al., 1993). In one study on this topic, researchers designed an intervention based on stimulus control to promote recycling of paper wastes among office workers on a university campus (Kalsher et al., 1993). Initial observations revealed that the office environments in which these persons worked actually discouraged the recycling of paper wastes. The employees' wastebaskets were located next to their desks or workstations. In contrast, recycling bins were located in dingy basements or on another floor of the building. Thus, the waste baskets and recycling bins served as *discriminative stimuli* that signaled the availability of very different consequences. Throwing paper into the trash was quick, easy, and convenient. In contrast, the recycling bins signaled a long walk, lost time, and a great deal of inconvenience.

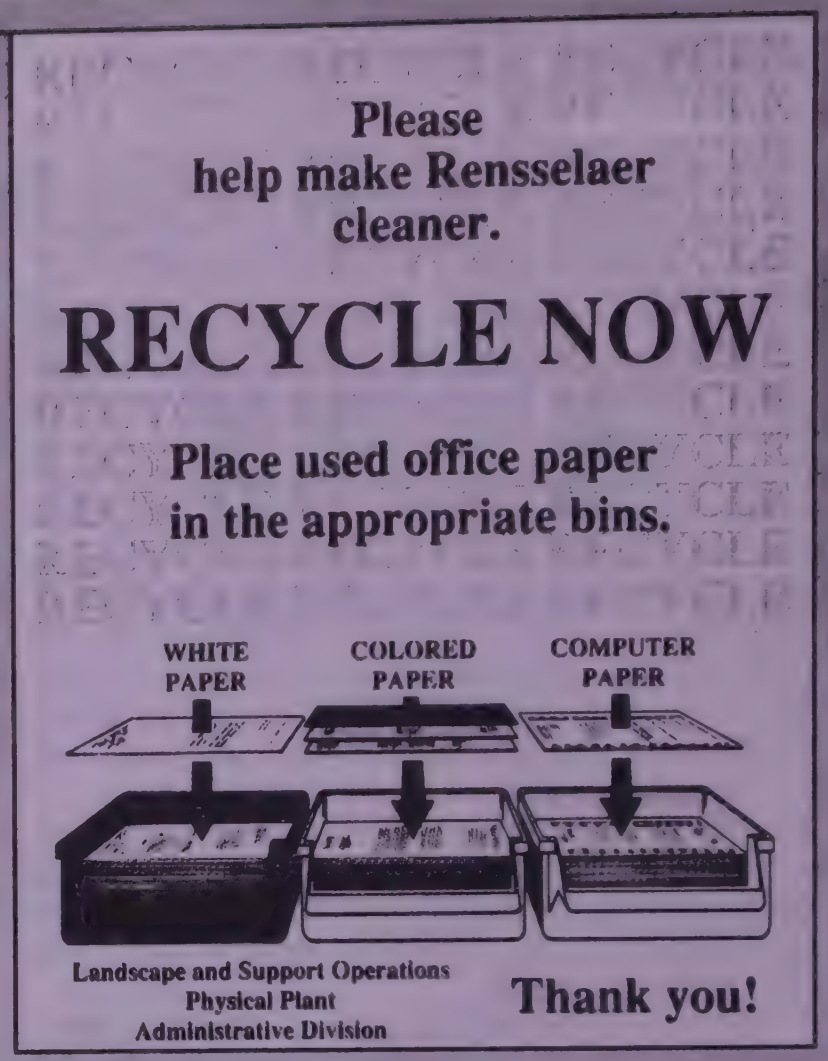
Kalsher and his colleagues attempted to redesign the office environments to be more conducive to recycling. They began by equipping the offices of four campus buildings with sets of colored bins for the purpose of sort-separating three types of recyclable paper waste (please refer to Figure 5.9 on page 200). Colorful posters above each set of bins gave specific instructions for correct placement of the papers. In addition, brochures describing the program were distributed to all employees to ensure that they knew the appropriate recycling procedures. Results showed that the program was successful: Both the average daily weight of paper recycled and the percentage of paper correctly sorted into the bins increased dramatically. Moreover, the program did not require the use of money or other extrinsic rewards.

In sum, operant conditioning and the three-term contingency are indeed powerful tools for solving a variety of important social problems—including recycling.

FIGURE 5.9

Stimulus Control in Action: Promoting Recycling Behaviors

Poster used to prompt correct placement of paper wastes. The bins depicted in the poster were colored to correspond to each bin's purpose—red for white paper, yellow for colored paper, and blue for computer paper.
(*Source:* Kalsher et al., 1993.)



CRITICAL THINKING QUESTIONS

1. Rearranging the work environment appeared to increase recycling behavior in the study just described—without the use of external rewards. Which approach, stimulus control or rewards, do you believe would be more effective in producing long-term behavior change?
2. In what ways could knowledge of stimulus control be applied to solve other environmental problems? Please give an example.

OPERANT CONDITIONING: A Cognitive Perspective

Do cognitive processes play a role in operant conditioning as they do in classical conditioning? This continues to be a point on which psychologists disagree. Skinner and his supporters have contended that there is no need to introduce cognition into the picture: If we understand the nature of the reinforcers available in a situation and the schedules on which they are delivered, we can accurately predict behavior. But many other psychologists—a majority, it appears—believe that no account of operant conditioning can be complete without attention to cognitive factors (e.g., Colwill, 1993). Several types of evidence support this conclusion.

First, and perhaps most dramatic, is the existence of a phenomenon known as *learned helplessness:* the lasting effects produced by exposure to situations in which nothing an organism does works—no response yields reinforcement or provides escape from negative events. After such experience, both people and animals seem literally to give up. And here is the unsettling part: If the situation changes so that some responses will work, they never discover this fact. Rather, they remain in a seemingly passive state and simply don't try (Seligman, 1975; Tennen & Eller, 1977). Learned helplessness has important implications. As we'll see in later chapters, learned helplessness may play a key role in depression, a serious psychological disorder. Although it is not clear why learned helplessness occurs (McReynolds, 1980), it seems impossi-

ble to explain it entirely in terms of contingent relations between individual responses and the consequences they produce. Rather, some evidence suggests that organisms learn a general expectation of helplessness that transfers across situations, even if they do gain control over their environment (Maier & Jackson, 1979). The onset of learned helplessness seems to stem from our perceptions of control; when we begin to believe that we have no control over our environment or our lives, we stop trying to improve our situations (Dweck & Licht, 1980). For example, many children growing up in urban slums perceive they have little control over their environment and even less hope of escaping it. As a result of learned helplessness, they may simply resign themselves to a lifetime of disenfranchisement, deprivation, and exclusion.

Second, several studies indicate that in some cases people's beliefs about schedules of reinforcement may exert stronger effects on behavior than do the schedules themselves. For example, in one study (Kaufman, Baron, & Kopp, 1966), three groups of participants performed a manual response on a variable-interval schedule; the period between reinforcements varied, but averaged one minute. One group was told the schedule would be in effect. Two other groups were given false information: one was told that they would be rewarded every minute, a fixed-interval schedule; the other was told that they would be rewarded after an average of 150 responses, a variable-ratio schedule. Although all groups actually worked on the same schedule, large differences in their behavior emerged. Those who thought they were working on a variable-ratio schedule showed a high rate of responses: 259 per minute. Those told they would be rewarded on a fixed-interval schedule showed a very low rate of 6 responses per minute; and those who were correctly informed that they would work on a variable-interval schedule showed an intermediate rate of 65 responses per minute. As suggested by Bandura (1986, p. 129), people's behavior may sometimes be more accurately predicted from their beliefs than from the actual consequences they experience.

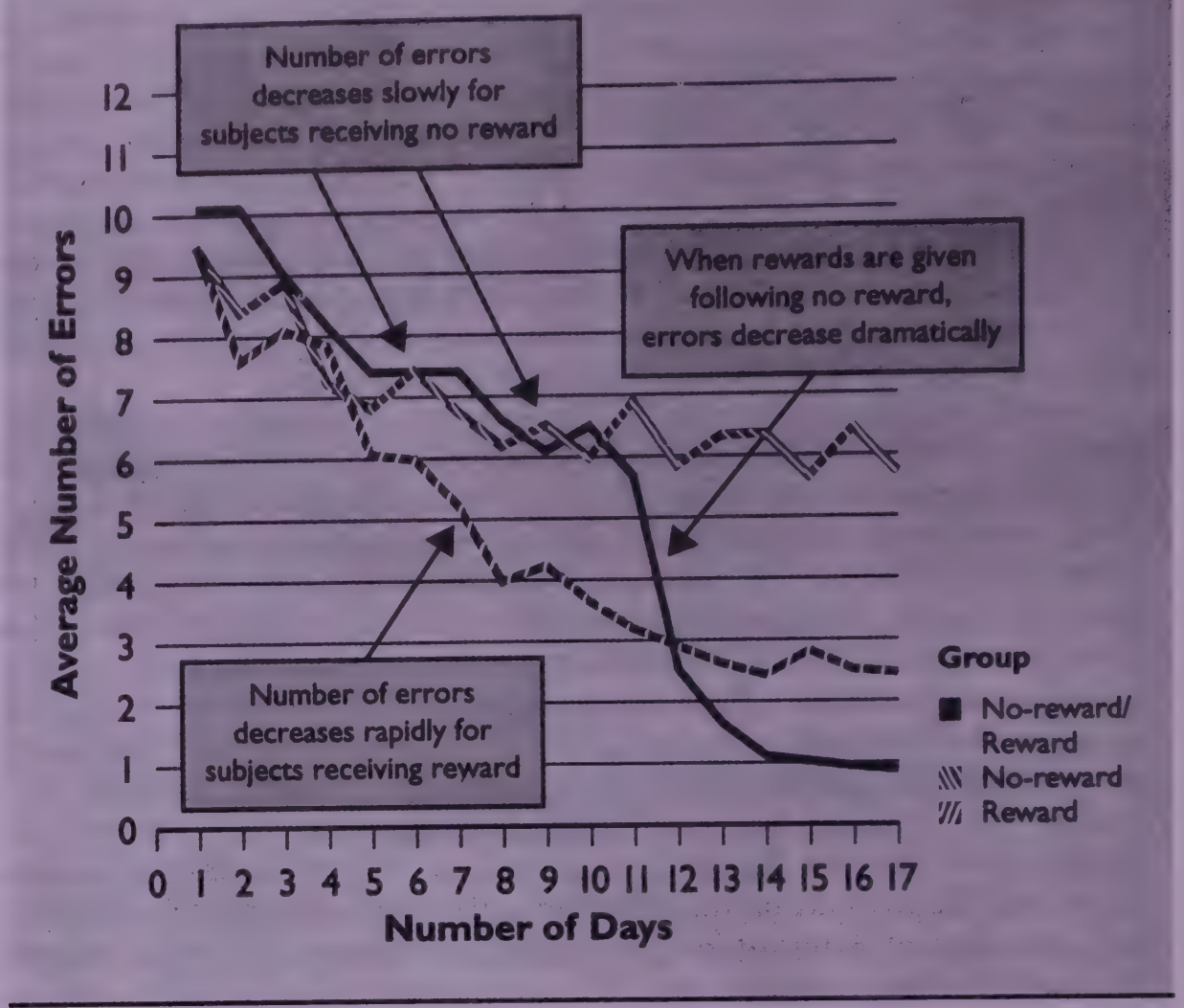
Third, evidence suggests that our behavior is influenced not only by the level of rewards we receive, but by our evaluation of rewards relative to our experiences with previous rewards. Studies have shown that shifts in the amount of reward we receive can dramatically influence performance, a temporary behavior shift termed the *contrast effect* (e.g., Crespi, 1942; Flaherty & Largen, 1975; Shanab & Spencer, 1978). For example, when laboratory animals are shifted from a small reward to a larger reward, there is an increase in their performance to a level greater than that of subjects consistently receiving the larger reward. This increase is known as a positive contrast effect. Conversely, when subjects are shifted from a large reward to a smaller reward, their performance decreases to a level lower than that of subjects receiving only the smaller reward—a negative contrast effect. But positive and negative contrast effects are transient. Thus, the elevated or depressed performances slowly give way to performance levels similar to those of control animals that receive only one level of reward. The existence of contrast effects indicates that level of reward alone cannot always explain our behavior and that experience with a previous level of reward—and consequent expectancies—can dramatically affect our performance. Contrast effects also help explain certain instances of our everyday behavior. For example, following an unexpected raise in salary or a promotion, a person is initially elated, and his or her performance skyrockets—at least for a while. Then, after the novelty wears off, performance falls to levels equal to that of others already being rewarded at the same level.

Finally, evidence suggests that cognitive processes play an important role in learning among animals, as well. In a classic study by Tolman and Honzik (1930), rats were trained to run through a complicated maze. One group, the

FIGURE 5.10

The Role of Cognitive Processes in Learning

Performance for rats in the no-reward/reward group improved dramatically immediately after the introduction of the food reward. Because the improvement was so dramatic, these data suggest that the animals "learned" something during previous trials—even though they received no reward for their efforts. Tolman used this as evidence for the importance of cognitive processes in learning, suggesting that the rats may have formed a "cognitive map." (*Source*: Based on data from Tolman & Honzik, 1930.)



reward group, received a food reward in the goal box at the end of the maze on each of their daily trials. A second group, the no-reward group, never received a reward. The third group, the no-reward/reward group, did not receive a food reward until the eleventh day of training. As illustrated in Figure 5.10, rats in the reward group showed a steady improvement in performance, decreasing the number of errors they made in reaching the goal box. Rats in the no-reward group showed only a slight improvement in performance. Rats in the no-reward/reward group showed performance similar to those in the no-reward group—for the first ten days. However, their performance improved dramatically immediately after the introduction of the food reward. In fact, their performance was as good as that of rats who had been rewarded for their performance all along.

How do we account for these results? An explanation based on reinforcement alone is not sufficient; the performance of the third group was too sudden. Obviously, the rats had learned something in the previous trials. Tolman and others point to these data, and the results of other studies (e.g., Colwill & Rescorla, 1985; 1988), as evidence for the importance of cognitive processes in learning. In fact, Tolman theorized that the rats may have formed what he termed a *cognitive map*—a mental representation of the maze. Although the existence of such maps has not yet been clearly established (e.g., Dyer, 1991; Wehner & Menzel, 1990), a large body of evidence supports the view that under certain conditions, animals form mental representations of their environment that include spatial and temporal features of stimuli they encounter (Poucet, 1993). Although we do not yet fully understand their precise nature, one thing is clear: Cognitive processes play an important and active role in animal learning.

Applying Operant Conditioning: Can We Make a Difference?

Because positive and negative reinforcement exert powerful effects on behavior, procedures based on operant conditioning have been applied in many practical settings—so many that it would be impossible to describe them all here. An overview of some of these uses will suffice, though.

First, principles of operant conditioning have been applied to the field of education. One of the most impressive operant-based teaching techniques is termed *precision teaching* (Lindsley, 1992). In this approach the "precision teacher" rarely lectures; instead, she performs like a coach, organizing materials and methods for the students to teach themselves and each other. The learners are taught to measure and chart their own daily progress on standard charts. The charts provide students with immediate feedback and facilitate more efficient learning. The tools and methods used in precision teaching permit even primary-grade students to project, improve, and summarize their own learning (Bates & Bates, 1971).

Another educational application of operant techniques involves the use of computers in the classroom—often termed *computer-assisted instruction*, or *CAI*. In CAI, students interact with sophisticated computer programs that provide immediate reinforcement of correct responses. The programs are paced according to each student's progress and permit the student to enter branch programs for special help in areas of weakness. Some evidence suggests that students may learn to take greater responsibility for their own performance under CAI than under teacher-led instruction, because they view computers as impersonal and therefore fairer. CAI technology includes the use of computer-based simulation exercises that allow students to apply what they've learned in the classroom to solve problems under realistic conditions. With the color graphics, synthesized speech, and other effects available on increasingly sophisticated equipment, CAI instruction may add excitement and enhance motivation for learning.

A second intriguing area of application of operant conditioning is in connection with eating disturbances such as *anorexia nervosa* (see chapter 10). Persons suffering from this disorder literally starve themselves. How can operant techniques be used to deal with this problem? Consider an individual who has been hospitalized because her unwillingness to eat is seriously affecting her health. In order to help this person, we might first ask her to monitor her eating behavior carefully and then identify something she likes, such as watching a favorite television program. Then we would make this activity available only when she eats a minimum amount of food. At first, the patient would have to eat only a small amount of food in order to gain access to a television. In accordance with the principles of shaping, however, the amount she must eat would gradually be increased. Such procedures, when used as part of a comprehensive treatment plan, have been successful (Bemis, 1987; Schmidt, 1989).

Third, principles of operant conditioning have been applied in interventions for solving socially significant issues in our communities, such as crime, energy conservation and recycling, health care issues, consumer affairs, and safety promotion (Greene et al., 1987). For example, experts tell us that more than half of the 50,000 deaths that occur on our highways each year could be prevented by the consistent use of safety belts. Yet many drivers and their passengers do not use the belts, despite the existence of safety-belt mandates in most states. A large body of evidence suggests that operant principles can be used effectively to increase the use of safety belts (e.g., Geller et al., 1987, 1989; Hagenzeiker, 1991). In one study, Kalsher et al. (1989) tested safety-belt

incentives and disincentives at two large naval bases. At the incentive base, the license-plate numbers of drivers observed buckled up were entered into weekly drawings for prizes donated by local merchants, including a grand prize of a tropical vacation. The disincentive program, in contrast, consisted of a media blitz publicizing an existing safety-belt mandate and threatening consequences for noncompliance ranging from a warning ticket to a complete loss of on-base driving privileges. Would the "carrot" of pleasant consequences or the "stick" of aversive consequences be more effective? As it turned out, the increase in safety-belt use for the disincentive base was highest initially, but long-term follow-up showed that the two approaches were equally effective for motivating safety-belt use.

Interestingly, much of the increase observed at the disincentive base was due to safety-belt observations taken on vehicles entering the navy base, where a marine guard was present. If you recall our discussion of stimulus control, then you've probably guessed that the presence of the guard served as a *discriminative stimulus*—one that signaled the prospect of a particular consequence: a ticket for not being buckled up.

Fourth, operant conditioning principles have been applied to a severe disorder in which individuals inflict injury on themselves—*self-injurious behavior*, or *SIB* (Carr, 1977; Lovaas, 1982). SIB occurs frequently in individuals with mental retardation or autism, and manifests itself in a variety of forms, including head hitting, self-biting, severe scratching, eye gouging, and even hair pulling, known as trichotillomania (Maurice & Trudel, 1982). How can care givers use operant techniques to treat self-injury? First, by determining the factors that maintain its occurrence. Using a unique observational assessment procedure, Iwata and his colleagues discovered that individuals engage in self-injury for a variety of reasons (Iwata et al., 1982). Some individuals engage in SIB to attract the attention of people around them, whereas others do so to avoid or terminate demands placed on them. Still others engage in SIB as a form of self-generated sensory reinforcement. Iwata and colleagues' assessment procedure has led to the development of many effective techniques to treat this unsettling form of behavior (e.g., Iwata et al., 1990; Pace et al., 1993; Van Houten, 1993).

Finally, techniques of operant conditioning have been applied to many issues and problems in work settings—for example, to improve the performance of sales personnel and waiters (e.g., Luthans, Paul, & Baker, 1981; George & Hopkins, 1989) and in the development of flexible work schedules (Winett & Neale, 1981). These techniques have also helped improve the performance of work groups. For example, Petty, Singleton, and Connell (1992) demonstrated that a group incentive program improved the productivity of employees in a division of an electric utility company, thereby reducing the cost of electricity to its customers. Moreover, employees perceived that the incentive plan increased teamwork and encouraged greater employee involvement in decision making. Perhaps the most intriguing use of operant principles in work settings, though, has involved efforts to answer an age-old question: Why are some persons more effective in the role of leader or manager than others? Researchers have carefully observed and then analyzed the actual on-the-job behavior of managers within the framework of operant conditioning (e.g., Komacki, 1986). The results indicate that effective managers are ones who pay close attention to their subordinates' performance and then provide contingent rewards and punishments. This

KEY POINTS

- Discriminative stimuli signal the availability of specific consequences if a certain response is made. When a behavior occurs consistently in the presence of a discriminative stimulus, it is said to be under stimulus control.
- Studies of learned helplessness and contrast effects support the conclusion that cognitive factors play an important role in operant conditioning.
- Procedures based on operant conditioning principles can be applied to help solve many practical real-world problems.

approach may sound like common sense, but in fact it doesn't come naturally in many work settings. Often, instead of yielding rewards, good performance is "recognized" by higher expectations and therefore more work and tougher challenges. Clearly, both organizations and their workers can profit greatly from closer attention to basic principles of operant conditioning.

OBSERVATIONAL LEARNING: *Learning from the Behavior and Outcomes of Others*

You are at a formal dinner party. Next to your plate are five different forks, including two of a shape you've never seen before. Which ones do you use for which dishes? You have no idea. In order to avoid making a complete fool of yourself, as the first course arrives, you watch the other guests. When several reach unhesitatingly for one of the unfamiliar forks, you do the same. Now, thank goodness, you can concentrate on the food.

Even if you have not had an experience quite like this, you have probably encountered situations in which you have acquired new information, forms of behavior, or even abstract rules and concepts from watching other people. Such **observational learning** is a third major way we learn, and it is a common part of everyday life (Bandura, 1977, 1986). Indeed, a large body of research findings suggest it can play a role in almost every aspect of behavior. A few examples:

- A student chef watches while an experienced chef prepares a soufflé; under the guidance of this person, she then tries to prepare one herself.
- A couple watches a television program that shows step by step how to remodel a bathroom. The following day, the couple sets out to remodel their own.
- A child watches his parents wash dishes, do the laundry, cook meals, and go to their jobs each morning. From such experience, he forms an impression that married couples share the responsibilities of running a household.

In these and countless other instances, we appear to learn vicariously, merely by watching the actions of other persons and the consequences others experience. More formal evidence for the existence of observational learning has been provided by hundreds of studies, many of them performed with children. Perhaps the most famous of these studies are the well-known "Bobo doll" experiments conducted by Bandura and his colleagues (e.g., Bandura, Ross, & Ross, 1963). In these studies one group of nursery-school children saw an adult engage in aggressive actions against a large inflated Bobo doll. The adult who was serving as a model knocked the doll down, sat on it, insulted it verbally, and repeatedly punched it in the nose. Another group of children were exposed to a model who behaved in a quiet, nonaggressive manner. Later, both groups of youngsters were placed in a room with several toys, including a Bobo doll. Careful observation of their behavior revealed that those who had seen the aggressive adult model often imitated this person's behavior: They too punched the toy, sat on it, and even uttered verbal comments similar to those of the model. In contrast, children in the control group rarely if ever demonstrated such actions. While you may not find these results

Observational Learning: *The acquisition of new information, concepts, or forms of behavior through exposure to others and the consequences they experience.*

Ivan Petrovich Pavlov (1849–1936)

A Russian physiologist, Pavlov conducted now-famous experiments on the digestive processes of dogs that uncovered a basic principle of learning: classical conditioning. His work became a cornerstone for the school of behaviorism. In 1904, Pavlov was awarded the Nobel Prize for his research.

John B. Watson (1878–1958)

Watson moved psychology away from studying the contents of the mind to studying only observable behavior, an approach known as *behaviorism*.

KEY PEOPLE IN LEARNING

surprising, they may be significant in relation to the enduring controversy over whether children acquire new ways of aggressing through exposure to violent television programs and movies. We'll return to this issue below. For the moment, let's consider the nature of observational learning itself.

OBSERVATIONAL LEARNING: Some Basic Principles

Given that observational learning exists, what factors and conditions determine whether, and to what extent, we acquire behaviors, information, or concepts from others? According to Bandura (1986), who is still the leading expert on this process, four factors are most important.

First, in order to learn through observation you must direct your *attention* to appropriate *models*—that is, to other persons performing an activity. And, as you might expect, you don't choose such models at random but focus most attention on people who are attractive to you; on people who possess signs of knowing what they're doing, such as status or success; and on people whose behavior seems relevant to your own needs and goals (Baron, 1970).

Second, you must be able to *remember* what the persons have said or done. Only if you can retain some representation of their actions in memory

B. F. Skinner (1904–1990)

Skinner was Professor Emeritus at Harvard University and a leader in the field of *behaviorism*. His work focused on explaining the causes of behavior by looking at events in the environment (stimuli) and the organism's response.

Albert Bandura

Bandura has focused on observational learning and the role of thought in establishing and maintaining behavior. Some of his most notable research includes studies of the ways in which children learn to be aggressive.

can you perform similar actions at later times or acquire useful information from them.

Third, you need to be able to convert these memory representations into appropriate actions. Bandura terms this aspect of observational learning *production processes*. Production processes depend on (1) your own physical abilities—if you can't perform the behavior in question, having a clear representation of it in memory is of little use; and (2) your capacity to monitor your own performance and adjust it until it matches that of the model.

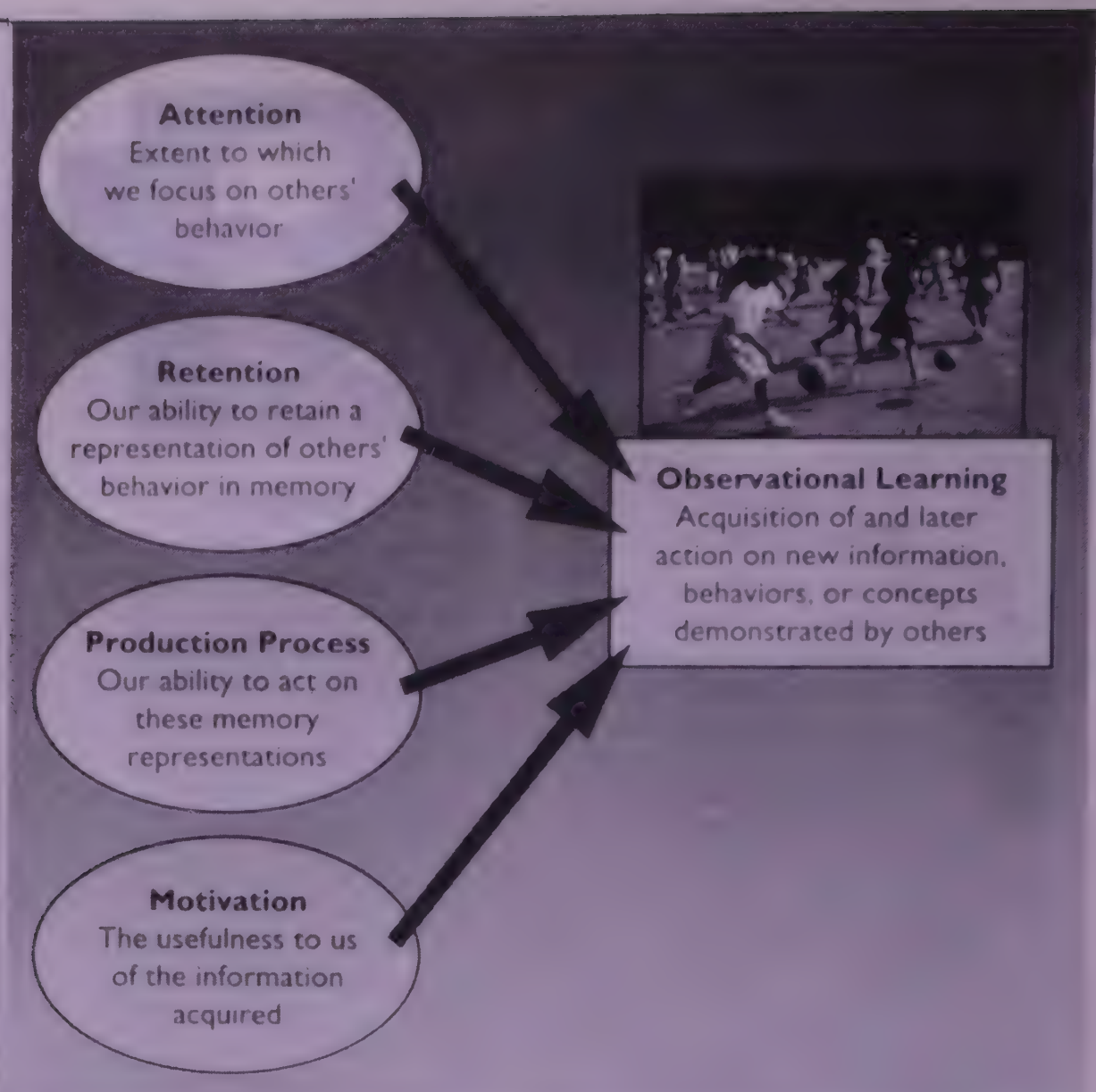
Finally, *motivation* plays a role. We often acquire information through observational learning but do not put it into immediate use in our own behavior. You may have no need for the information, as when you watch someone tie a bow tie but have no plans to wear one yourself. Or the observed behaviors may involve high risk of punishment or be repugnant to you personally, as when you observe an ingenious way of cheating during an exam but don't want to try it yourself. Only if the information or behaviors acquired are useful will observers put them to actual use. Figure 5.11 (on page 208) summarizes factors affecting observational learning.

As you can see, observational learning is a complex process—far more complex than mere imitation—and plays an important role in many aspects of behavior. This point is perhaps most forcefully illustrated by the controversy that has persisted in psychology, and in society as a whole, since the early

FIGURE 5.11

Key Factors in Observational Learning

Observational learning is affected by several factors or subprocesses. The most important of these are summarized here.



1960s: whether children, and perhaps even adults, are made more aggressive by long-term exposure to violence on television shows or in movies.

Observational Learning and Aggression

A large body of evidence suggests that aggression may indeed be learned through observation (Baron & Richardsdon, 1994; Centerwall, 1989; Snyder, 1991; Wood, Wong, & Chachere, 1991). Apparently, when children and adults are exposed to new ways of aggressing against others—techniques they have not previously seen—they may add these new behaviors to their repertoire. Later, when angry, irritated, or frustrated, they may put such behaviors to actual use in assaults against others.

Of course, exposure to media violence, whether on the evening news or in movies or television programs, has other effects as well. It may convey messages that violence is an acceptable means of handling interpersonal difficulties; after all, if heroes and heroines can do it, why not viewers? It may elicit additional aggressive ideas and thoughts, convincing viewers, for example, that violence is even more common than it is (Berkowitz, 1984). And it may also lessen emotional reactions to aggression and the harm it produces, so that such outcomes seem less upsetting or objectionable (Thomas, 1982). When these effects are coupled with new behaviors and skills acquired through observational learning, the overall impact may contribute to an increased tendency among many persons to engage in acts of aggression (Eron, 1987).

It is important to note that not all findings support such conclusions (Freedman, 1986; Widom, 1989) and that the effects of exposure to media violence, when they occur, seem to be modest in scope. Given the fact that many children spend more time watching television and playing violent video games than they do any other single activity, however, the potential influence of such experience on behavior seems worthy of careful attention.

Research has also studied the effects of television on behavior in other areas of life. For instance, in one large-scale study, Geller (1988) examined automobile safety-belt use among stars on prime-time television shows for three years (1984–86). In general, the results of this study showed that the major television networks were, at least initially, irresponsible in their broadcasting practices. Drivers and their passengers were rarely shown belted, and the most probable consequences of crashes for unbelted vehicle occupants, serious injury or death, were almost never depicted. In response to this, Geller and his students initiated a nationwide campaign designed to bring public attention to the nonuse of safety belts by television stars. As part of this campaign, they encouraged children to write letters to their television heroes, requesting that they use safety belts. In one instance, more than 800 students from Olympia, Washington, wrote buckle-up requests to Mr. T, a star on a popular action program called "The A-Team." Interestingly, Mr. T increased from no belt use in 1984 to over 70 percent belt use in 1985, following the letter-writing campaign.

It is noteworthy that safety-belt use on television shows *increased* over the three-year period of the study, consistent with changes in national safety-belt use statistics. Because television shows enjoy such a massive viewing audience, often millions of viewers, efforts to depict exemplary behavior among network stars—like safe driving—could potentially save millions of lives.

Observational learning, then, plays an important role in many aspects of behavior—including our language and customs. The **Perspectives on Diversity** section below explores this point further.

Key Points

- Observational learning is more complex than simple imitation.
- Several factors determine the extent to which we acquire new information through observation: We must pay attention to those modeling the behavior, remember the modeled speech or action, possess the ability to act on this memory, and have the motivation to do so.
- Observational learning plays a role in many forms of behavior, including aggression.
- Observational learning may play an important role in training workers to interact more effectively with people from different cultural backgrounds.

Perspectives on Diversity

Learning to Avoid Culture Shock

Recently, psychologists have applied principles of observational learning to help solve a problem of growing concern: preparing people for the "culture shock" that can sometimes occur when they live and work in another country with a different language and unfamiliar customs.

As the United States and other nations move toward a global economy, companies throughout the world are faced with a difficult challenge. They must prepare their employees for a business environment that requires a broad range of skills and the ability to interact effectively with people from other cultures (Adler & Bartholomew, 1992; Feldman & Tompson, 1993). Dramatic differences in language, customs, and lifestyle often lead to unintended misunderstandings between persons from different cultural backgrounds. Behaviors that are acceptable and encouraged in one country may be offensive and intolerable to persons from another country. Indeed, ignorance

OBSERVATIONAL LEARNING: ADAPTING TO DIVERSITY

Observing the behaviors of others can help us acquire important social skills that will be needed as we move rapidly toward a global economy.

of cultural differences has long been cited as a chief cause of misunderstandings between persons of different cultural backgrounds (Harris, 1979).

The scope of such differences was called sharply—and repeatedly—to my attention during a recent extended visit to France. One difference in particular stands out in my memory. In the United States, children treat adults in a casual manner; indeed, they often call them by their first name. In France, the situation is very different. Children are required to show a high degree of politeness toward adults. For example, whenever French children came within about ten feet of me, they would stop, bow slightly, and say "Good day, sir!" before running by. They would certainly never have thought of pushing by me or bumping me as they passed. How different things were when I visited the Museum of Natural History in New York during the Christmas holidays. The museum was literally swarming with youngsters, and I soon lost count of the number who stepped on my feet or pushed me out of the way as they ran by. Imagine the reactions of French visitors to the United States when confronted with such behavior!

To soften the effects of such cultural gaps, companies that conduct business abroad have scrambled to develop cross-cultural training programs. The goal of these programs is to help a company's representatives toward more appropriate, sensitive, and consistent behavior in their cross-cultural interactions. Initial efforts to prepare employees for cross-cultural assignments focused on a cognitive approach, in which trainees received factual information about a particular country (Fielder et al., 1971).

More recently, however, experts in the area of cross-cultural training have advocated an "experiential" approach based on behavioral modeling (Black & Mendenhall, 1990). In the behavioral modeling approach, trainees first watch films in which models exhibit the correct behaviors in a problem situation. Then they participate in a situation role-playing exercise to test their knowledge. Finally, they receive constructive feedback regarding their performance.

Are such programs effective? Research findings suggest that the answer is yes. In one study, Harrison (1992) compared the effectiveness of several approaches to cross-cultural training. One experimental group received culture-relevant information only; another received behavioral modeling training only; a third received both components; and a fourth was a no-training control group. The results showed that participants who received both forms of training—information and behavioral modeling—performed best on measures of culture-specific knowledge and on a behavioral measure.

These findings, and those of other related studies, illustrate the important role that observational learning plays in alleviating the effects of culture shock. Observational learning initially enables us to perform behaviors appropriate to our own cultures, but later helps us to adapt to the demands of a rapidly changing world.

Making Psychology Part of Your Life

Getting in Shape: Applying Psychology to Get Fit and Stay Fit

Need to get back into shape? Or lose a pound or twenty? Why not make learning principles a part of your fitness system—the *true* breakfast of champions. Establishing your fitness program using the learning principles we've discussed in this chapter will help you hit the diet and exercise trail running.

First, it is important to set your sights realistically. Don't try to lose all twenty pounds in one week or run ten miles the first time out. Why not? Recall reinforcement and punishment: Setting impossible goals will lead to failure, and failure will actually punish your efforts, making it even more difficult to stay with your program. If you've tried to stick with a diet or exercise program in the past and failed because of this, you can probably appreciate the point.

Instead, set yourself up for small wins by taking advantage of the principle of *shaping*—rewarding yourself with modest rewards for successive steps toward your ultimate exercise and weight-reduction goals. Then slowly increase the amount of exercise that you do or the amount of weight that you lose, building on each of your previous successes. Also, take care to choose rewards that are desirable but consistent with your goals. For example, if you are trying to lose weight, reward yourself with a movie or pants with a smaller waist size—not with a hot fudge sundae.

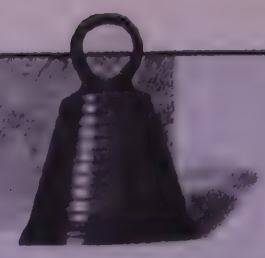
Third, specify the amount and intensity of the exercise you will do or the amount of weight you intend to lose—and write it down. Some people find that it is helpful to chart their progress in order to give themselves accurate and immediate feedback that will serve to reinforce or punish their behavior. Also, by placing the chart in a prominent place for yourself and your friends and family to see, you can take advantage of both positive and negative reinforcement. For example, you can work to receive the positive attention that will come your way when your chart shows progress. Negative reinforcement may also help you, because by posting your progress publicly you can work to avoid the negative comments you may get if you are tempted to "take a day off . . . just because."

Fourth, *stimulus control* can help set the stage for healthy responses. So avoid situations where you may be tempted to consume unhealthy food or beverages, and instead begin going to places and meeting people that are likely to occasion healthy responses. For example, by joining a health club, YMCA, or other *active* organization, you will be more likely to exercise and eat healthy.

Finally, take advantage of the principles of observational learning by identifying people with traits and skills that you admire. By observing and then emulating their behavior, you may become more efficient in reaching your goals. So to get fit and stay fit, make psychology a part of your fitness system.

Charting the progress of an exercise or weight loss program may help keep you on track because it provides accurate and immediate feedback.

Summary and Review of Key Points



Classical Conditioning: Learning That Some Stimuli Signal Others

Key Terms:

learning, p. 176
classical conditioning, p. 177
stimulus, p. 177
unconditioned stimulus (UCS), p. 178
unconditioned response (UCR), p. 178
conditioned stimulus (CS), p. 178
conditioned response (CR), p. 178
acquisition, p. 179
delayed conditioning, p. 179
trace conditioning, p. 179
simultaneous conditioning, p. 179
backward conditioning, p. 179
extinction, p. 182
reconditioning, p. 182
spontaneous recovery, p.182
stimulus generalization, p. 182
stimulus discrimination, p. 182
biological constraints on learning, p. 184
conditioned taste aversion, p. 184
phobias, p. 187
flooding, p. 187

- Learning is any relatively permanent change in behavior (or behavior potential) produced by experience.
- Classical conditioning is a basic and powerful form of learning in which neutral stimuli come to cause a response through their association with stimuli that naturally elicit a response.
- Acquisition of classically conditioned responses depends on many factors: temporal arrangement of the conditioned stimulus–unconditioned stimulus pairings, intensity of the conditioned stimulus and unconditioned stimulus relative to other background stimuli, and familiarity of potential conditioned stimuli present in the conditioning environment. Delayed conditioning and a brief CS–UCS interval are generally the most effective.
- Although a conditioned stimulus gradually ceases to elicit a conditioned response through extinction, it can quickly regain this ability through reconditioning: a renewed pairing of the conditioned stimulus with the unconditioned stimulus.
- Stimulus generalization and discrimination are essential tools for survival. Generalization allows us to apply our learning to many other situations; in contrast, discrimination allows us to differentiate among similar but different stimuli.
- Classical conditioning is not equally easy to establish with all stimuli for all organisms. There are important biological constraints on such learning, and members of a given species may acquire some types of conditioning more readily than other types of conditioning.
- Conditioned taste aversions can be established in one trial when a food or beverage (conditioned stimulus) is paired with a stimulus that naturally produces feelings of illness (unconditioned stimulus).
- Classical conditioning involves more than the formation of simple associations between stimuli. Some modern views of classical conditioning emphasize the important role of cognitive processes such as expectancies about the occurrence of various stimuli
- In blocking, conditioning to one stimulus is prevented by previous conditioning to another stimulus.
- Basic principles of classical conditioning can be used to treat serious problems, such as phobias and drug overdoses.
- In flooding, a person is forced to come into contact with fear-eliciting stimuli without an avenue of escape.
- Cases in which fearful thoughts are too painful to deal with directly are treated by systematic desensitization—a progressive technique designed to replace anxiety with a relaxation response.

Operant Conditioning: Learning Based on Consequences

Key Terms:

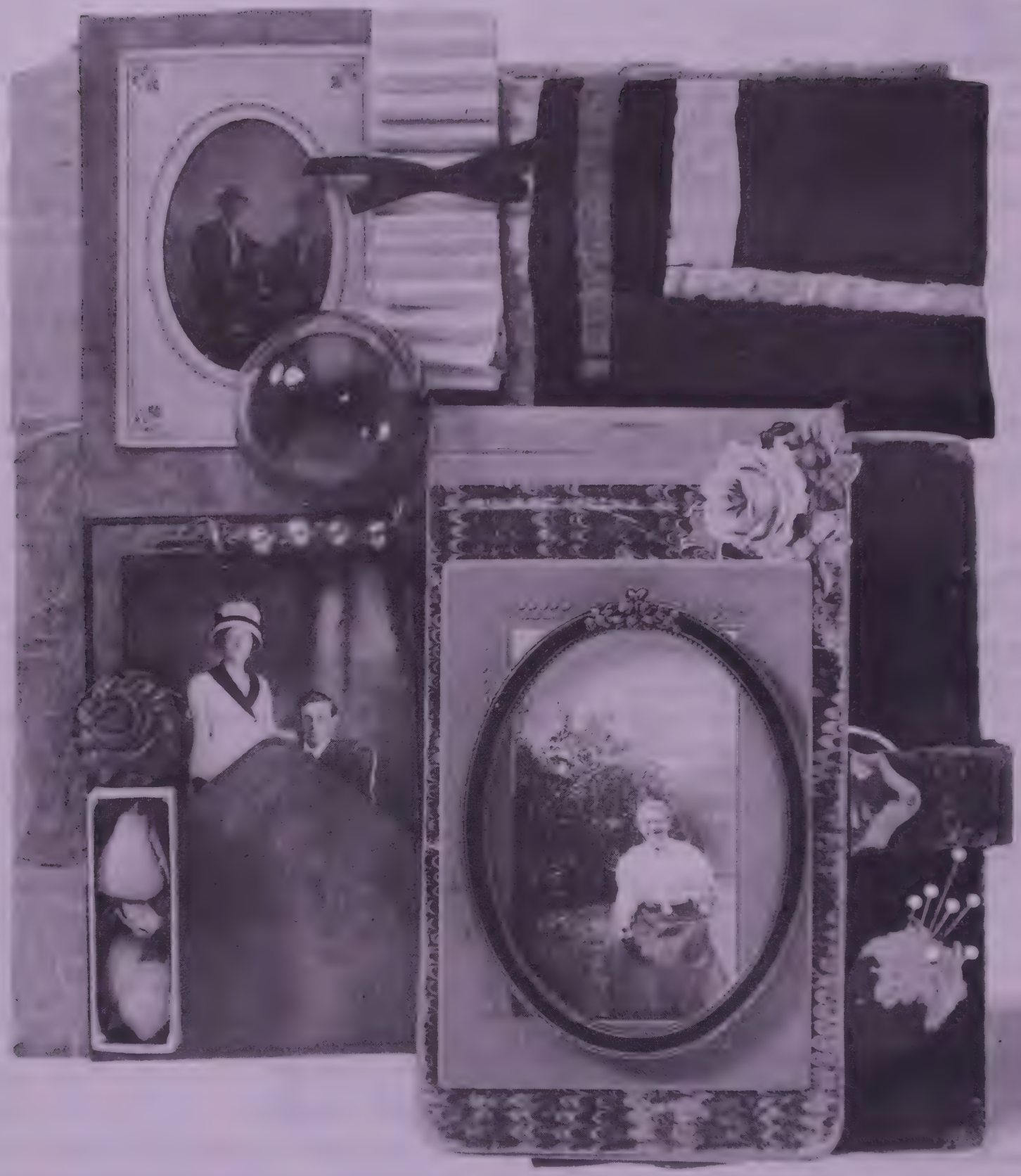
operant conditioning, p. 190
reinforcement, p. 190
positive reinforcers, p. 190

- In operant conditioning, organisms learn the relationships between behaviors and the consequences they produce.
- Both positive and negative reinforcement strengthen or increase behavior, whereas punishment and omission training aim to weaken or suppress behavior.
- Primary reinforcers include food, water, and sexual pleasure. Conditioned reinforcers such as money, status, and praise acquire their ability to act as positive reinforcers through association with primary reinforcers.
- The Premack principle suggests that preferred activities can be used to reinforce less preferred activities.
- Shaping involves reinforcing successive approximations of the final desired behavior.

Premack principle, p. 190 negative reinforcers, p. 190 punishment, p. 191 omission training, p. 191 shaping, p. 194 chaining, p. 194 schedules of reinforcement, p. 195 continuous reinforcement schedule, p. 197 fixed-interval schedule, p. 197 variable-interval schedule, p. 197 fixed-ratio schedule, p. 197 variable-ratio schedule, p. 197 discriminative stimulus, p. 198 stimulus control, p. 198	• Chaining involves teaching a complex sequence of behaviors by first shaping the final response in the sequence, then working backwards until a chain of behaviors is learned. • Schedules of reinforcement are rules that determine the occasion on which a response will be reinforced. • Schedules of reinforcement can be time-based (interval schedules) or event-based (ratio schedules). They can also be fixed or variable. • A continuous reinforcement schedule is desirable for establishing new behaviors, since it reinforces each instance of a behavior; partial or intermittent schedules of reinforcement, however, are often more powerful in maintaining behavior over time. • Discriminative stimuli signal the availability of reinforcement if a certain response is made. When a behavior occurs consistently in the presence of a discriminative stimulus, it is said to be under stimulus control. • Several types of evidence, including studies of learned helplessness and contrast effects, support the conclusion that cognitive factors play an important role in operant conditioning. For example, people's beliefs about reinforcement schedules and people's evaluation of rewards may exert strong effects. • Procedures based on operant conditioning principles can be applied to help solve many practical real-world problems.
OBSERVATIONAL LEARNING: LEARNING FROM THE BEHAVIOR AND OUTCOMES OF OTHERS Key Term: observational learning, p. 205	• Observational learning is more complex than simple imitation. • Several factors determine the extent to which we acquire new information through observation: we must pay attention to those modeling the behavior, remember the modeled speech or action, possess the ability to act on this memory, and have the motivation to do so. • Observational learning plays a role in many forms of behavior including aggression. • Observational learning may play an important role in training workers to interact more effectively with people from different cultural backgrounds.

CRITICAL THINKING QUESTIONS

APPRAISAL	At the present time, many psychologists are moving increasingly toward a cognitive view of the learning process. Do you think this movement is appropriate, or is there still a role for the views of operant psychologists?
CONTROVERSY	Growing evidence suggests that animals do indeed form mental representations of their environments that are analogous to those formed by human beings. Does this mean that animals think? What are your views on this issue? What are the implications of this theory of animal learning?
MAKING PSYCHOLOGY PART OF YOUR LIFE	Knowing something about important principles of learning is very useful to persons who wish to get into shape or lose weight. But these are only two ways in which knowledge of learning can be applied to help people. Can you think of others?



Memory:

Of Things Remembered . . . and Forgotten

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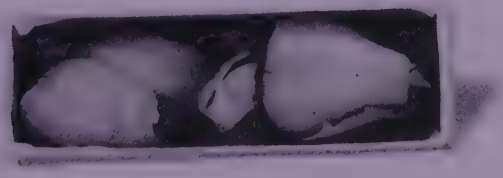


Memory, people often say, is a very funny thing, and our life experience tends to confirm this particular bit of folklore. Have you ever forgotten a phone number you looked up in the directory before you could manage to dial it? Have you ever taken a wrong turn while driving because your memory told you that your destination was off in one direction, only to learn, later, that it was really in the opposite one? Have you ever had your mind go blank when you were about to introduce two people to each other, or during an exam? Nearly everyone has had such experiences. In these situations we come face to face with the imperfect nature of our own **memory**—our cognitive system for storing and retrieving information.

When Memory Fails—or Does It?

While Calvin is obviously pulling one of his usual tricks, he's right about one thing: Memory is indeed far from perfect.

(*Source:* CALVIN AND HOBBES copyright 1987 & 1993 Watterson. Dist. by UNIVERSAL PRESS SYNDICATE. Reprinted with permission. All rights reserved.)

Yet while memory is clearly far from perfect, it is also very impressive in several respects. We often retain vivid—and accurate—memories of events and scenes from months, years, or even decades in the past. On a recent visit to my parents' home, I came across a copy of my high school yearbook. I hadn't seen it for many years, yet I found that I easily recognized virtually every face in the book—people I hadn't seen in more than three decades. In a similar manner, most people who learned how to ride a bicycle as children can do so successfully as adults, even if many years have passed since their last ride. In these and other respects, memory truly *is* impressive.

WHILE MEMORY IS CLEARLY FAR FROM PERFECT, IT IS ALSO VERY IMPRESSIVE IN SEVERAL RESPECTS.

Because it is clearly a crucial aspect of cognition, memory has long occupied a central place in psychological research. In fact, memory was the focus of some of the earliest systematic work in the field—studies conducted more than one hundred years ago by Hermann Ebbinghaus (1885). Using himself as a subject, Ebbinghaus memorized and then recalled hundreds of nonsense syllables—meaningless combinations of letters, such as teg or pxt. Some of his findings about the nature of forgetting have withstood the test of time and are valid even today. For example, he found that at first we forget materials we have memorized quite rapidly. Later, forgetting proceeds more slowly.

While Ebbinghaus's studies were ingenious in many respects, modern research on memory has gone far beyond these simple beginnings. It is probably safe to say that psychologists now know more about memory than about any other basic aspect of cognition. To provide you with an overview of this diverse and intriguing body of knowledge, we'll proceed in the following manner. First, we'll consider a basic model of human memory—one that is currently accepted by many psychologists. This model suggests that we actually possess three distinct memory systems. After describing the model, we'll examine each of these systems in turn, indicating how each carries out the basic tasks of memory: (1) entering information into storage, (2) retaining such input for varying periods of time, and (3) retrieving it when it is needed. Next, we'll explore the operation of memory in natural contexts—how memory operates in daily life, outside the confines of the experimental laboratory. We will focus on such issues as *autobiographical memory*, or memory of events and experiences in our own lives; *distortion and construction* in memory; and *eyewitness testimony*. We'll conclude by examining several memory disorders and what these disorders (plus other research) tell us about the biological nature of memory.

Memory: *The capacity to retain and later retrieve information.*

HUMAN MEMORY: The Information-Processing Approach

Have you ever operated a personal computer? If so, you already know that computers, like people, have memories. In fact, most have two different types of memory: a temporary, working memory (known as random access memory), and a larger, and more permanent memory in which information is stored for longer periods of time (a hard drive). Do the memories of computers operate like those of human beings? Almost certainly not. Consider the following differences. Unless you correctly specify the precise nature and location of information you want to find, computers are unable to recover it. They merely flash an error message such as "Invalid path." In contrast, you can often find information in your own memory even on the basis of a partial description. Similarly, if information is lost from a computer, it is often permanently gone. In contrast, you can fail to remember a fact or information at one time but then remember it readily at another. And you can often remember part of the information you want, even if you can't remember all of it. To repeat: human memory and computer memory are definitely *not* identical (Lewandowsky & Murdock, 1989).

Despite this fact, however, many researchers have concluded that there is sufficient similarity between computer memory and human memory for the former to serve as a rough working model for the latter. Both of these types of memory, after all, must accomplish the same basic tasks: (1) **encoding**, or converting information into a form that can be entered into memory; (2) **storage**, or retaining information over varying periods of time; and (3) **retrieval**, or locating and accessing specific information when it is needed at later times. Please don't misunderstand: The fact that computers and human memory deal with the same basic tasks in no way implies that they operate in an identical manner. They certainly do not. Thus, you should view this **information-processing approach** primarily as a useful means for drawing a bead on the key issues. It is a convenient way of discussing memory—not a fully developed representation of how memory operates.

HUMAN MEMORY: One Influential Model—and an Emerging New Approach

Having issued these cautions, I should quickly note that in psychology the study of memory has proceeded, since the late 1960s, largely within the context of the information-processing approach. Thus, it makes good sense to organize much of this chapter around that basic theme. Further, several important models of memory rest firmly on this basic approach. Of these, a model proposed by Atkinson and Shiffrin (1968) has been perhaps the most influential.

THE MODAL MODEL: THREE KINDS OF MEMORY SYSTEMS The Atkinson-Shiffrin model is sometimes described as the *modal*, or most representative, model. Its most central feature is the contention that in fact we possess not one but *three* distinct memory systems. One of these, known as *sensory memory*, provides temporary storage of information brought by our senses. If you've ever watched someone wave a flashlight in a dark room and perceived what seemed to be trails of light behind it, you are familiar with the operation of sensory memory.

Encoding: *The process through which information is converted into a form that can be entered into memory.*

Storage: *The process through which information is retained in memory.*

Retrieval: *The process through which information stored in memory is located.*

Information-Processing Approach: *An approach to understanding human memory that emphasizes the encoding, storage, and later retrieval of information.*

A second type of memory is known as *short-term memory* (STM). Short-term memory holds relatively small amounts of information for brief periods of time, usually thirty seconds or less. This is the type of memory system you use when you look up a phone number and dial it immediately.

Our third memory system, *long-term memory*, allows us to retain vast amounts of information for very long periods of time. For example, consider the following incident (Marek, 1975). Once, just before the beginning of a concert, the noted conductor Arturo Toscanini was approached by a member of the orchestra who said that the lowest note on his bassoon was broken. Toscanini thought for a moment and then replied, "It is all right; that note does not occur in tonight's concert." In other words, in just a few moments he had mentally run through the entire score for all the instruments! Clearly, from the point of view of duration and capacity, long-term memory can be impressive. As we'll soon see, though, its key problem is retrieval: finding a specific piece of information in this huge storage system.

How does information move from one memory system to another? We'll return to this complex question in more detail below, but here I can note that the modal model (Atkinson & Shiffrin, 1968) suggests the operation of *active control processes* that act as filters, determining which information will be retained. Information in sensory memory enters short-term memory when it becomes the focus of our attention; sensory impressions that do not engage attention fade and quickly disappear. So, where memory is concerned, **selective attention**—our ability to pay attention to only some aspects of the world around us while largely ignoring others—often plays a crucial role.

In contrast, information in short-term memory enters long-term storage through *elaborative rehearsal*—when we think about its meaning and relate it to other information already in long-term memory. (Figure 6.1 provides a summary of the Atkinson and Shiffrin model.)

Parallel Distributed Processing: An Emerging Perspective While the modal model and related views remain important in psychology, other influential perspectives on memory exist as well (Craik & Lockhart, 1972). Of these, perhaps the one now receiving the greatest amount of attention is the **parallel distributed processing model** (Lewandowsky & Murdock, 1989). According to this model, information is not processed in the step-by-step manner proposed by the Atkinson-Shiffrin model. In other words, it does not move from sensory to short-term and from short-term to long-term memory. Rather, the parallel distributed processing model suggests that information is actually processed simultaneously in several different parts of our total memory system. These parts or units operate in parallel, working on the same information at once. This means that many copies or representations of given information are present simultaneously at numerous locations within memory and can be accessed from any of these.

Selective Attention: *Our ability to pay attention to only some aspects of the world around us while largely ignoring others.*

Parallel Distributed Processing Model: *A model suggesting that our memory systems process information in several different ways simultaneously.*

Why do many psychologists find this model so appealing? Because something like parallel processing of information is in fact necessary to account for many daily activities involving memory. For example, consider reading. This task, which most of us can perform with ease, includes recognizing the vertical, horizontal, and curved lines that combine to make up letters, identifying letters themselves, understanding words, and comprehending combinations of words. It is difficult to see how all these tasks could be performed so quickly and smoothly in the absence of something like parallel processing. In short, we must possess some mechanism for processing complex information from what we read *and* complex information already stored in memory at once.

So models of memory based on parallel processing seem consistent with the ways in which memory actually operates—and also, as we'll see in a later

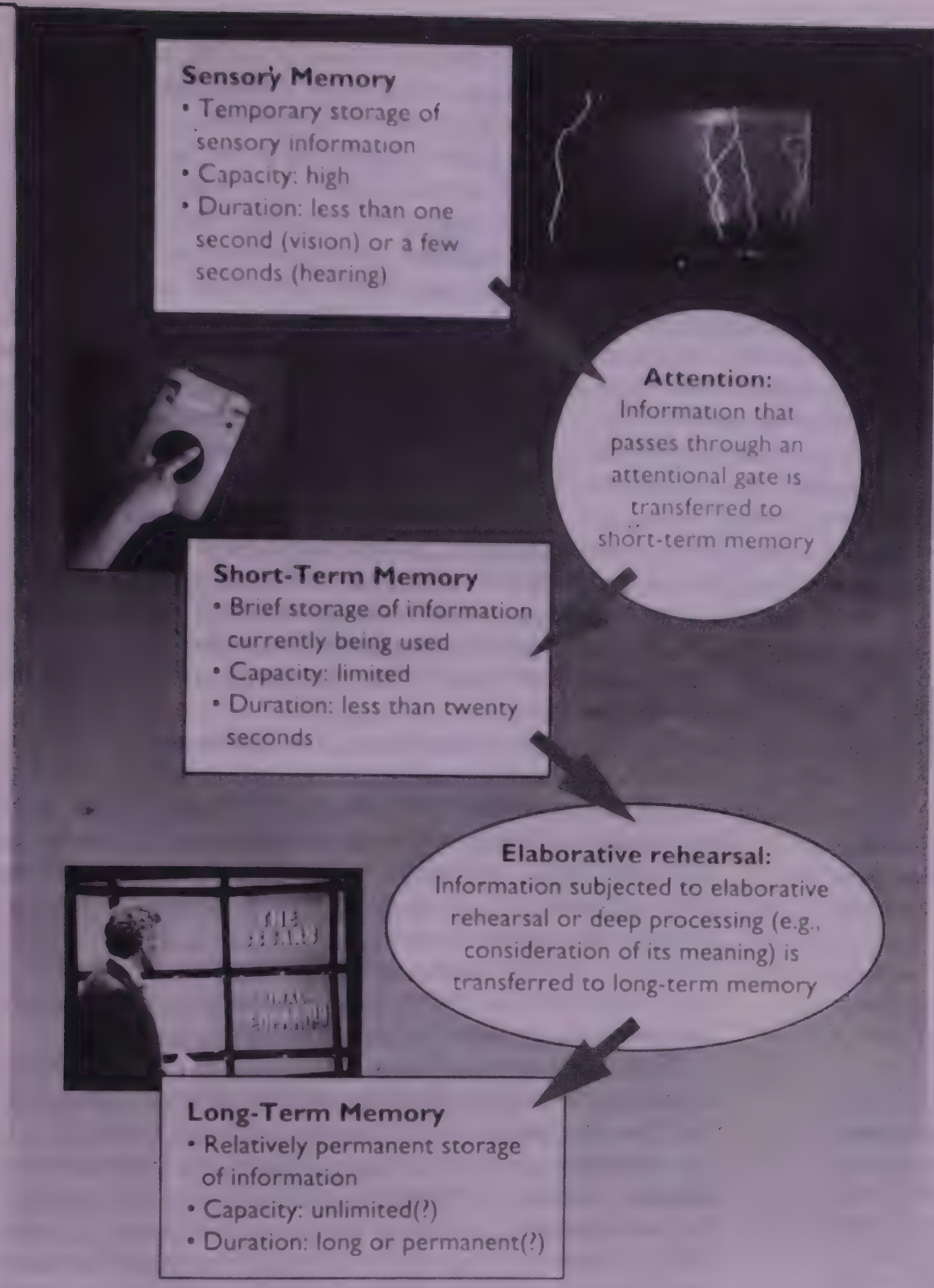


FIGURE 6.1

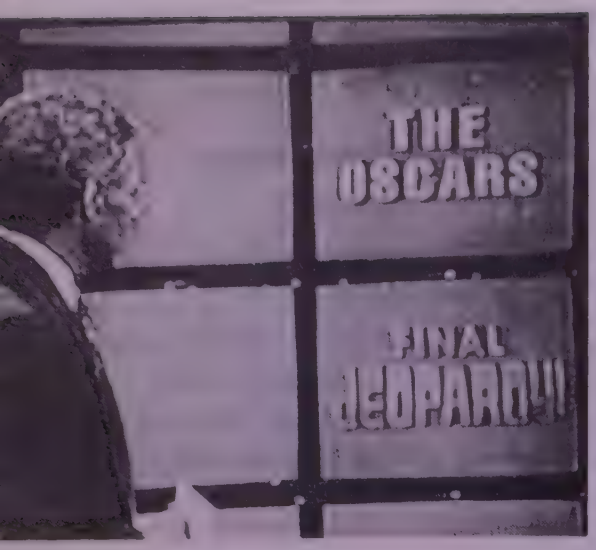
One Widely Accepted Model of Memory

According to a model proposed by Atkinson and Shiffrin (1968), we actually possess three distinct memory systems. Information moves between these through *active control processes* such as attention and elaborative rehearsal.

section, with growing evidence about the functioning of the human brain. To the extent that it helps us establish such links between cognitive and neural activity, the parallel distributed processing perspective may prove to be a valuable one.

Types of Information in Memory

If memory is a system (or, as we have seen, a set of systems) for retaining information, the next question is obvious: What types of information does it store? The world, and our experience in it, is incredibly diverse, so this is a



Semantic Memory in Action

People who are highly successful on television quiz shows, like *Jeopardy*, have stored a tremendous amount of general knowledge in their semantic memories.

more complex question than you might at first assume. After careful study, however, psychologists have concluded that most, if not all, information in memory can be classified as falling into one of three distinct categories.

The first is **semantic memory**: the sum total of each person's general, abstract knowledge about the world. What is the population of the United States? Is France larger or smaller than Brazil? Are shrimp crustaceans or mollusks? And, whatever their place in the animal kingdom, how long does it take to cook them? The answers to these and countless other questions are contained in semantic memory. Persons who win large prizes on television quiz shows are ones who have managed to expand the scope of their semantic memory beyond that of most other human beings. Semantic memory allows us to represent and mentally operate on objects or situations that are not present to our senses. As one expert on memory puts it (Tulving, 1993, p. 67), "The owner of a semantic memory system can think about things that are not here now."

A second type of information we retain involves specific events that we have experienced personally. This is known as **episodic memory** (or sometimes as *autobiographical memory*), and it is these memories that allow us, in a sense, to travel back in time. When was the last time you went to a movie? How did you feel on the day of your most recent graduation? What was it like to drive a car for the first time? Information pertaining to these and countless other aspects of your own experience are contained in episodic memory.

Another way to understand the difference between semantic and episodic memory is to think about the conscious experiences associated with them. When we retrieve information from episodic memory, we experience this as the act of remembering; in a sense, we experience again something that happened to us in the past. In contrast, when we retrieve information from semantic memory, we realize that we know this information—we can bring it to mind. This is quite different from the conscious experience of remembering events in our lives (Tulving, 1993).

Finally, we retain information relating to the performance of various tasks. Do you know how to ice skate? Tie a necktie? Play the saxophone? If so, then you are well aware of the operation of our third type of memory, known as **procedural memory**. Procedural memories are the result of the basic learning processes discussed in chapter 5. In contrast to semantic and episodic memories, these memories are difficult to put into words; indeed, as we saw in chapter 4, trying to do so and becoming overly self-conscious can interfere with smooth performance. Yet such memories are extremely important, for without them we would be unable to retain many skills once they are learned.

As you can readily guess, we often require—and use—information of all three types at once. Consider a student taking a final examination. Obviously, she is drawing on facts stored in semantic memory. In addition, she is using complex motor skills such as writing, which are represented in procedural memory. And as she takes the exam, she may think about experiences with other examinations. For example, she may remember that recently she actually lowered her grade on an exam by changing many correct answers to wrong ones. As she recalls this, she may refrain from revising several answers. In this and many other situations, all three types of information are used at once.

Key Points

- Several influential models of human memory suggest that we possess three distinct memory systems: sensory memory, short-term memory, and long-term memory.
- Evidence indicates that, in at least some memory systems, information is processes in a parallel, rather than a step-by-step, manner.
- Several different types of information are stored in memory: Semantic memory holds general information about the world; episodic memory holds information about experiences from our own lives; and procedural memory holds nonverbal information that allows us to perform various motor tasks.

Semantic Memory: *The content of our general, abstract knowledge about the world.*

Episodic Memory: *Memories of events that we have experienced personally (sometimes termed autobiographical memory).*

Sensory Memory: Gateway to Consciousness

You are waiting in a busy airport. Many different activities are occurring around you. People are rushing about; passengers are moving through security gates; people are talking, laughing, crying, hugging. You glance at a large video monitor containing flight information. You look away, but then, almost instantly, you look back to it. Something seemed different—what was it? Groaning, you realize that your flight has been delayed—again. Discouraged, you settle back in your chair for an even longer wait.

This incident may seem at first to have more to do with the difficulties of modern travel than with memory; but think again: What made you glance back at the screen? The answer involves what is in a sense our simplest memory system: **sensory memory**. This system holds representations of information from our senses very briefly—just long enough, it appears, for us to determine that some aspect of this input is worthy of further attention. Without such memory, you would have had no reason to look back at the video monitor. As soon as your eyes moved away from it, all traces of the screen and its contents would have vanished. In this and countless other situations, sensory memory is useful indeed. Without it, we'd be able to react only to those stimuli reaching us at a given instant.

How much can sensory memory hold? And how long does such information last? Existing evidence suggests that the capacity of sensory memory is quite large—indeed, it may hold fleeting representations of virtually everything we see, hear, taste, smell, or feel (Reeves & Sperling, 1986). These representations are retained for only brief periods, however. Visual sensory memory seems to last for less than a second, while acoustic sensory memory lasts for no more than a few seconds (Cowan, 1984). Convincing evidence for these conclusions was first gathered by Sperling (1960) in a series of now well-known experiments.

In one of these studies, participants were shown nine letters arranged in rows of three on a card. These stimuli were shown very briefly—for only 50 milliseconds (0.05 second). Participants were then asked to report all the letters they could remember. Under these procedures, their memory was not impressive: They could recall only about four or five of the nine letters shown. However, they reported the impression that right after seeing the card, they could remember all of the letters; the visual image faded quickly, however, so by the time participants had named four or five letters, the rest were completely gone. To determine if this was actually happening, Sperling devised an ingenious technique. Immediately after presentation of the letters, he sounded a tone that was either high, medium, or low in pitch. The high tone meant that participants should report the first row, the medium tone indicated that they should report the second, and so on. Results were clear: Under these conditions, participants demonstrated near-perfect scores. Just how quickly does such information fade? To answer this question, Sperling repeated the above procedures, but delayed presentation of the tone for various periods of time. Results indicated that sensory memory is indeed brief. When the tone was delayed only 0.10 second (100 milliseconds), participants' performance dropped sharply; when it was delayed for an entire second, their ability to remember the letters all but disappeared.

Visual Sensory Memory

Visual sensory memory holds an image, such as a flash of lightning, for only a fraction of a second—just long enough for us to determine if it is worthy of further attention.

Key Points

- Sensory memory holds fleeting representations of our sensory experiences.
- These representations can be quite broad in scope but generally last less than one second.

Procedural Memory: *A memory system that retains information we cannot readily express verbally—for example, information necessary to perform skilled motor activities such as riding a bicycle.*

Sensory Memory: *A memory system that retains representations of sensory input for brief periods of time.*

These findings, confirmed in many later studies, point to two conclusions. Sensory memory exists, and it can store an impressive amount of information. But it is very short-lived. Where sensory memory is concerned, then, it appears to be a matter of "now you see (hear) it, now you don't."

Short-Term Memory: The Workbench of Consciousness

Imagine that you are in an ethnic restaurant tasting foods you've never had before. One of the dishes is truly delicious, so you ask the waiter for its name in his native language. He tells you, and you repeat it several times until you get it right. A couple of minutes later, you decide to write it down so you won't forget. You get out your pen and paper—only to find that it is already too late: You've forgotten the name of the dish. Have you ever had an experience like this? If not, remember the last time you looked up a phone number and forgot it while in the act of dialing; or the last time you met someone, only to forget his or her name within seconds of hearing it. Such experiences point to the existence of our second memory system: **short-term memory**, which holds a limited amount of information for a brief period of time. Despite its limitations, short-term memory, like sensory memory, is very important. Indeed, many experts view it as a kind of workbench for consciousness—a system for temporarily holding information you are using or processing right now. Thus, another term for short-term memory is *working memory*.

Evidence for the Existence of Short-Term Memory

Everyday experience strongly supports the existence of short-term memory and the view that it is distinct from long-term memory. But before turning to some of the basic characteristics of this memory system, let's also look briefly at some of the scientific evidence for its presence.

The Serial Position Curve Suppose that someone read you a list of unrelated words and asked you to recall as many as possible in any order you wished. Which words would you be most likely to remember? Research findings indicate that you would be more likely to remember words at the beginning and at the end of the list than words in the middle (see Figure 6.2). Why does this effect, known as the **serial position curve**, occur? One possible answer involves the existence of two memory systems. Presumably, you remember the last words you heard quite well—a *recency* effect—because they are still in short-term memory when you are asked to recall them. And you remember the words at the start of the list because they have already been entered into long-term memory. Words in the middle, in contrast, have vanished from short-term memory and are not yet fully present in long-term memory. Several different studies have obtained results consistent with this reasoning (Postman & Phillips, 1965). The serial position curve concept, then, provides support for the existence of two distinct memory systems.

Short-Term Memory: *A memory system that holds limited amounts of information for relatively short periods of time.*

Serial Position Curve: *The greater accuracy of recall of words or other information early and late in a list than words or information in the middle of the list.*

The Word-Length Effect A related finding is that lists of short words are often recalled more successfully than lists of long words—a finding known as the *word-length effect*. Recent evidence (e.g., Cowan et al., 1992) indicates that

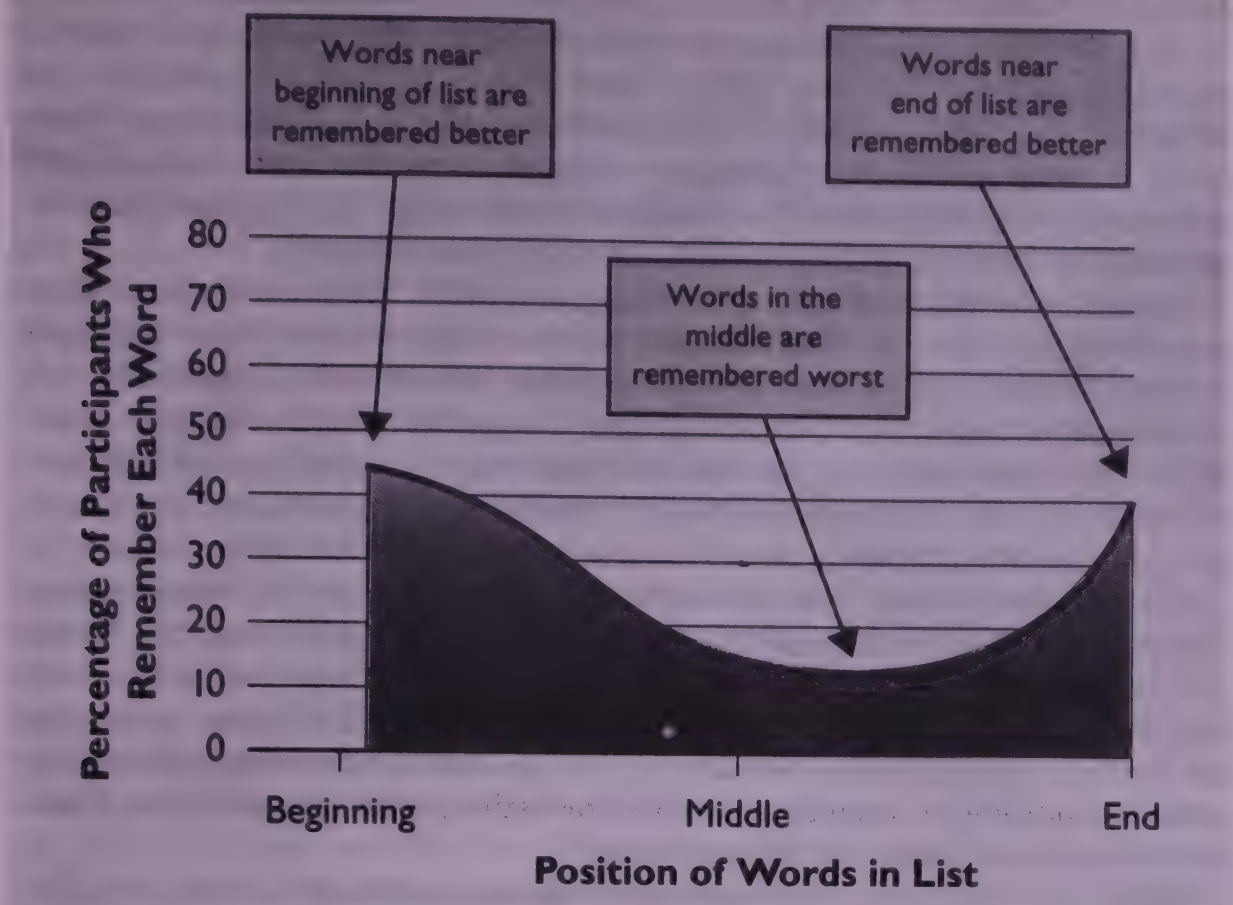


FIGURE 6.2

The Serial Position Curve

When people try to recall a list of unrelated words, they usually remember more words from the beginning and end of the list than from the middle. This serial position curve provides evidence for the existence of two distinct memory systems: short-term and long-term memory.

this is due to the fact that memory representation of some words deteriorates during the time it takes to pronounce other words aloud during recall. This finding, too, points to the existence of a short-term memory system.

ACOUSTIC AND SEMANTIC CODING Additional evidence for the distinction between short-term and long-term memory comes from studies indicating that people have more difficulty in immediate recall of words or letters whose names sound alike, such as P, D, V, C, and T than of ones whose names sound different, such as K, Y, Z, W, and R (e.g., Wickelgren, 1965). This finding suggests that information is entered into immediate short-term memory in terms of acoustic coding—how it sounds. In contrast, when asked to recall words over longer periods, people have more difficulty remembering ones that sound different but are similar in meaning (such as big, huge, broad, long, tall) than ones that are dissimilar in meaning but sound alike (such as man, mad, cap, can). These latter findings suggest that information may be entered into long-term memory primarily in terms of its meaning. While other evidence suggests that this distinction is not as clear-cut as was once believed (Baddeley, 1990), the fact that information is coded differently when remembered for short periods of time than when remembered for longer ones supports the existence of two distinct memory systems.

In sum, despite some recent controversy concerning the existence of short-term memory (e.g., Crowder, 1993), considerable evidence offers support for the conclusion that we do indeed possess such a memory system (Cowan, Wood, & Borne, 1994).

SHORT-TERM MEMORY: Its Basic Operation

Now let's turn to some of the basic features of short-term memory. What kind of information does it hold? How much? And for how long?

In sensory memory, information is represented in a form similar to that reported by our senses. But information is represented somewhat differently in

short-term memory. In short-term memory most verbal input, both the words we read and the words others speak, seems to be stored acoustically, by how it sounds (Salame & Baddeley, 1982). There is some indication, however, that information is also represented semantically, in terms of its meaning. When asked to recall words they have just memorized, people often confuse ones with similar meanings as well as ones that sound alike. So, it appears that we can store information in different ways in short-term memory.

Second, how much can this memory system hold? The answer seems to be something like seven to nine separate pieces of information. However, each of these "pieces" can contain several separate bits of information—bits that are somehow related and can be grouped together into meaningful units. When this is the case, each piece of information is described as a **chunk**, and the total amount of information held in chunks can be quite large. For example, consider the following list of letters: IBFIMBWBMATWIAC. After hearing or reading it once, would you remember it? Probably not. But imagine that, instead, the letters were presented as follows: FBI, IBM, BMW, TWA, CIA. Could you remember them now? The chances are much better that you could, because now you could combine them into meaningful chunks—acronyms for famous organizations. Because of the process of *chunking*, short term memory can hold a large amount of information, even though it can retain only seven to nine separate items at once.

Third, how long does information in short-term memory system last? The answer is clear: not very long. Unless it is actively *rehearsed* (repeated again and again), information entered into short-term memory fades quickly. Indeed, if individuals are prevented from rehearsing—for example, by being asked to count backwards—the information may be almost totally gone within twenty seconds (e.g., Peterson & Peterson, 1959).

Additional evidence suggests that the greater the extent to which rehearsal is prevented, for example, by tasks even more distracting than counting backwards, the more rapid is the fading of short-term memory (Reitman, 1974). Further, most people seem aware of this important fact: When left to their own devices, a large majority of people actively rehearse information they wish to retain in short-term memory. The moral of such findings is clear. If you want to keep a phone number, a license plate, a new acquaintance's name, or any other piece of information in short-term memory, there's only one solution: rehearse, rehearse, and then rehearse some more.

KEY POINTS

- Short-term memory retains information for a few seconds.
- The existence of short-term memory is supported by the finding that words near either end of a list are remembered better than words near the middle—the serial position curve.
- Additional evidence for the distinction between short-term and long-term memory is the finding that people have more difficulty keeping words or letters that sound alike in short-term memory than retaining ones that do not.

LONG-TERM MEMORY: The Storehouse of Consciousness

Chunk: Stimuli perceived as a single unit or a meaningful grouping. Most people can retain seven to nine chunks of information in short-term memory at a given time.

Can you remember your first trip to the dentist? Your first-grade teacher? Your first date? Even though these events occurred long ago, the chances are good that you have vivid memories of them. The fact that you do points to the existence of a third memory system—one that permits us to store vast quantities of information in a relatively permanent manner. This is known as **long-term memory**, and evidence concerning its accuracy is nothing short of startling. For example, in one study, Standing, Canezio, and Haber (1970)

presented 2,560 color slides to participants at the rate of one slide each ten seconds. Later, they presented slides in pairs, each pair consisting of one slide participants had already seen and one they had not. The participants' task was to point to the slides they had seen earlier. Despite the enormous number of items shown, they were accurate almost 90 percent of the time!

Yet we have all had experiences in which we could not remember some item or piece of information, no matter how hard we tried. To make matters worse, at such times we often feel that the fact, name, or item we want is somewhere "in there" but lies just beyond our reach. This is known as the **tip-of-the-tongue phenomenon**, and research findings indicate that it is quite real. When individuals are given the definition of an uncommon English word such as *sampan*, *geode*, or *charisma* and report that they can almost think of the word, they are quite successful in supplying its first letter and indicating how many syllables it has (Brown & McNeill, 1966). To add to our frustration at such times, we often find ourselves repeatedly coming up with related but incorrect responses (Reason & Lucas, 1984). These tend to be words that are more common than the one we want, and as we think of them repeatedly, they tend to strengthen still further until they totally block all efforts to remember the word we really want. If we then give up, however, some kind of search often continues, and later, quite unexpectedly, the missing item suddenly appears in consciousness. These everyday experiences indicate that the information being sought is indeed present in memory but can't be located. As we'll soon see, *retrieval* is a crucial process where long-term memory is concerned; after all, information that can't be found is as useless to us, in a practical sense, as information that is no longer present.

So we are left with a mixed picture of long-term memory. On the one hand, it is impressive in its capacity to store huge quantities of information for long periods of time. On the other hand, it often lets us down just when we seem to need it most—for example, while we are taking exams or delivering an important speech. How does this memory system operate? How is information entered into long-term memory and later retrieved? These are among the questions we'll now consider.

Long-Term Memory: Its Basic Operation

The first question we should address is this: How does information enter long-term memory from short-term memory? The answer seems to involve a process we have already discussed: rehearsal. In this case, though, the rehearsal does not consist simply of repeating what we wish to remember, as in restating a phone number over and over again. Rather, for information to enter long-term memory, **elaborative rehearsal** seems to be required. This is rehearsal requiring significant cognitive effort; it can include thinking about the meaning of the new information and attempting to relate it to information already in memory (see Figure 6.3 on page 226). For example, if you wish to enter the facts and findings presented in a section of this chapter into long-term memory, it is not sufficient merely to state them over and over again. Instead, you should think about what they mean and how they relate to things you already know.

If elaborative rehearsal is required for information to enter long-term memory, then anything that interferes with such rehearsal should also interfere with long-term memory. Many factors produce such effects, but one with which many people have had direct experience is alcohol. Informal observation suggests that when consumed in sufficient quantities, this drug interferes

Long-Term Memory: *A memory system for the retention of large amounts of information over long periods of time.*

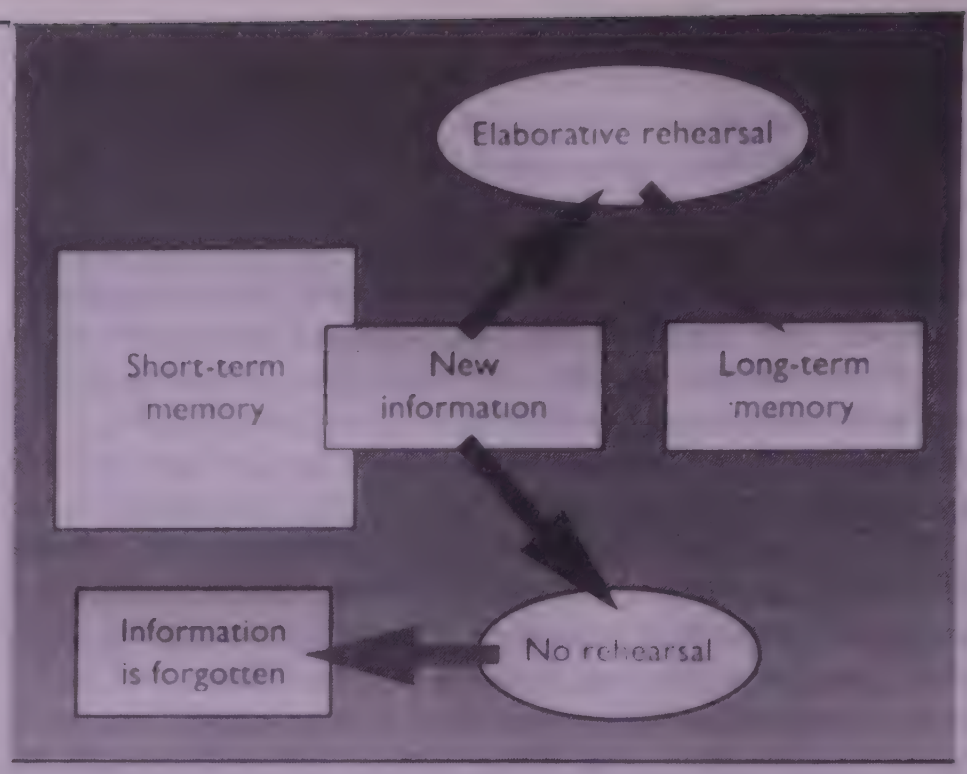
Tip-of-the-Tongue Phenomenon: *The feeling that we can almost remember some information we wish to retrieve from memory.*

Elaborative Rehearsal: *Rehearsal in which the meaning of information is considered and the information is related to other knowledge already present in memory.*

FIGURE 6.3

Entering Information into Long-Term Memory

In order for information to move from short-term memory to long-term memory, *elaborative rehearsal* is required. Such rehearsal involves thinking about the meaning of new information and attempting to relate it to information already in memory. If this cognitive effort is not expended, the new information may fail to enter long-term memory and be rapidly forgotten.



THE ROLE OF REHEARSAL

In order to pass from short-term to long-term memory, information must be rehearsed repeatedly.

with long-term memory, and research findings lend support to this claim: Alcohol does seem to impair human memory (Birnbaum & Parker, 1977). Specifically, it seems to interfere with the processes through which information is entered into long-term memory. We'll return to this topic in more detail in a discussion of eyewitness testimony later in this chapter (Yuille & Tollestrup, 1990).

LEVELS OF PROCESSING: COGNITIVE EFFORT AND LONG-TERM MEMORY We have been focusing on the concept of elaborative rehearsal as it relates to long-term memory; but now let's consider one of the alternative models of memory (alternatives to the modal model) we mentioned earlier: the **levels of processing view,** first introduced by Craik and Lockhart (1972). These researchers suggested that rather than concentrating on the structure of memory and the different systems it involves, it might be more useful to concentrate on the processes that contribute to remembering. They noted that information can be processed in several different ways, ranging from relatively superficial *shallow processing* through more effortful and lasting *deep processing*. Shallow processing might consist of merely repeating a word or making a simple sensory judgment about it—for example, do two words or letters look alike? A deeper level of processing might involve somewhat more complex comparisons—for example, do two words rhyme? A much deeper level of processing would include attention to meaning—for example, do two words have the same meaning? Does a word make sense when used in a specific sentence?

Levels of Processing View: *A view of memory suggesting that the greater the effort expended in processing information, the more readily it will be recalled at later times.*

Considerable evidence suggests that the deeper the level of processing that takes place when we encounter new materials, the more likely the materials are to enter long-term memory. For example, in a well-known study, Craik and Tulving (1975) presented unrelated words and asked participants one of three kinds of questions about each word: Was the word written in capital or lower-case letters? Did the word rhyme with another word? Did the word fit within a given sentence? After answering a large number of such questions, participants were asked whether each word in a list was one they had already seen or was new. Results offered clear support for the levels of processing

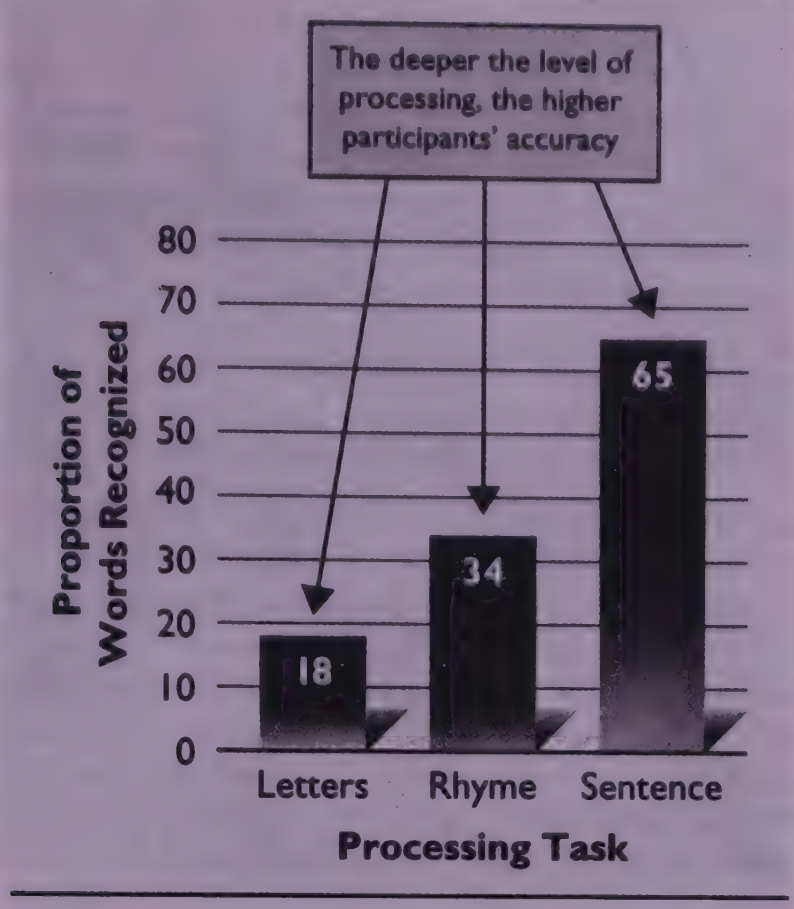


FIGURE 6.4

Levels of Processing and Memory

Individuals were asked one of three kinds of questions with respect to unrelated words. These questions required varying levels of processing. The deeper the level of processing required, the more accurately the participants could later identify the words. (*Source:* Based on data from Craik & Tulving, 1975.)

view. The deeper the level of processing performed by subjects, the slower their responses—but the more accurate their decisions (see Figure 6.4).

Why does deeper and more effortful processing of information lead to better long-term memory? One possibility is that such cognitive effort leads us to encode more features of the items in question. This, in turn, makes it easier to locate the information later. Supporting this view is the fact that, in general, when people not only see a series of objects but actually perform some action on them, they can later remember the names of the objects better in a test of free recall—a test in which they are simply asked to recall as many of the objects as possible (Nilsson & Cohen, 1988).

While such findings are compatible with the levels of processing model, there are still some difficulties with this model that cannot be overlooked. For example, it is difficult to specify in advance just what constitutes a deep versus a shallow level of processing. Second, it is not clear that a person can read a word over and over again and not be aware of, or think about, its meaning. In fact, several forms of processing (such as acoustic and semantic) may occur at once. So it is difficult to speak about discrete levels of processing.

Despite such problems, there can be little doubt that the levels of processing view has added to our understanding of long-term memory, and especially to our knowledge of how information is entered into this system.

RETRIEVAL: Locating Information in Long-Term Memory

As noted earlier, the limitations of short-term memory are all too obvious: It has limited capacity, and information is quickly lost unless it is continually rehearsed. Long-term memory, of course, does not have these problems. It has a seemingly limitless capacity, and it can retain information for very long periods, perhaps indefinitely. Is it, then, a perfect memory system? Definitely not. All too often we are unable to remember information we need just when

we need it. Only later—maddeningly!—does it sometimes appear effortlessly in our mind (Payne, 1987). What is the cause of such difficulties? The answer involves the process of *retrieval*—our ability to locate information that has previously been stored in memory.

Where long-term memory is concerned, it is difficult to separate retrieval from the issue of *storage*—the way information is initially placed in long-term memory. Storage plays an important role in determining how readily information can later be retrieved. In general, the better organized materials are, the easier they are to retrieve (Bower et al., 1969). One key to the effective retrieval of information from long-term memory, then, is *organization*. Organizing information requires extra effort, but it appears that the benefits in terms of later ease of retrieval make this effort well worthwhile.

Retrieval Cues: Stimuli That Help Us Remember Imagine that after an absence of several years, you return to a place where you used to live. On your arrival memories of days gone by come flooding back, with no apparent effort on your part to bring them to mind. You remember incidents you had totally forgotten, conversations with people you haven't seen in years, even the weather during your last visit. Have you ever had this kind of experience? If so, you are already familiar with the effects of what psychologists term **retrieval cues**. These are stimuli that are associated with information stored in memory and so can help bring it to mind at times when it cannot be recalled spontaneously. Such cues can be aspects of the external environment—a place, sights or sounds, even smells. Indeed, some evidence suggests that odors are particularly effective in evoking memories of events in our lives (Richardson & Zucco, 1989).

Many studies point to the important impact of retrieval cues on long-term memory. Perhaps the most intriguing research on this topic involves what is known as **context-dependent memory**: the fact that material learned in one environment is more difficult to remember in a very different context than it is in the original one. A study performed by Godden and Baddeley (1975) ingeniously illustrates context-dependent memory.

In this study, participants were practiced deep-sea divers. They learned a list of words either on the beach or beneath fifteen feet of water; then they tried to recall the words either in the same environment in which they had learned them or in the other setting. As shown in Figure 6.5, results offered striking evidence for the impact of context—in this case, physical setting. Words learned on land were recalled much better in this location than under water, and vice versa. Interestingly, such effects were not found with respect to recognition—merely deciding whether or not they had seen the words before (Godden & Baddeley, 1980). Thus, it appears that context-related retrieval cues are beneficial primarily with respect to actual recall. Additional findings suggest that it is not necessary to be in the location or context where storage into long-term memory occurred; merely imagining this setting may be sufficient (Smith, 1979). In other words, we seem capable of generating our own context-related retrieval cues.

Retrieval Cues: *Stimuli associated with information stored in memory that can aid in its retrieval.*

Context-Dependent Memory: *The greater ease of recall of information entered into memory in one context or setting in that same context than in others.*

State-Dependent Retrieval: *Retrieval of information stored in long-term memory cued by aspects of one's physical state.*

Finally, even our own internal states can serve as retrieval cues in some cases. The concept of **state-dependent retrieval** refers to the fact that it is often easier to recall information in long-term memory when our internal state is similar to that at the time the information was first learned than when these states are different. For example, suppose that while studying for an exam you drink lots of coffee. Thus, the effects of caffeine are present while you memorize the materials in question. On the day of the test, should you also drink lots of coffee so that the effects of caffeine will again be present? Will these effects act as a retrieval cue and enhance your memory? The results of several studies indicate that this will indeed be the case (Eich, 1985).

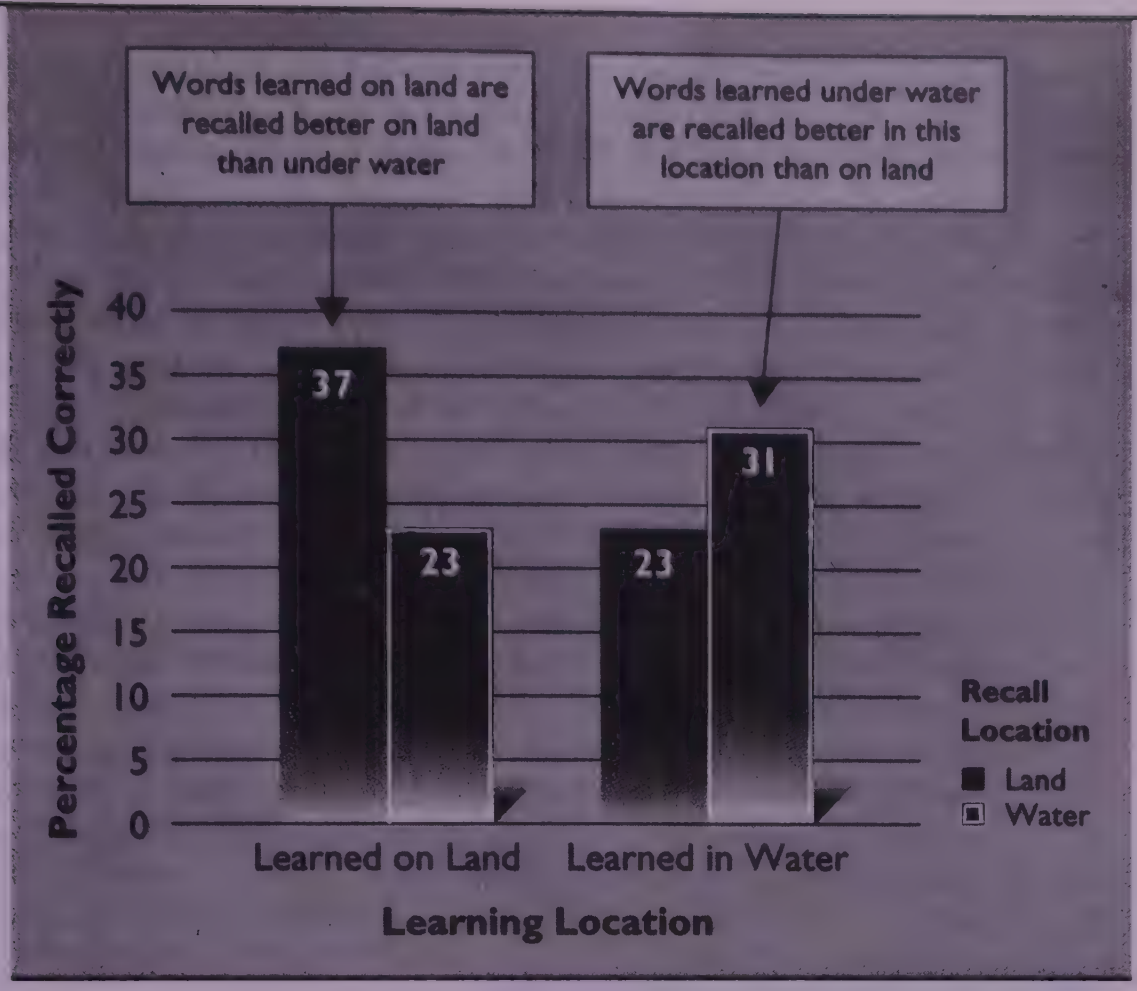


FIGURE 6.5

Context-Dependent Memory

Participants learned a list of words either on the beach or when under water. Later, they recalled the words more successfully in the same physical setting (context) where the learning took place. (*Source:* Based on data from Godden & Baddeley, 1975.)

Again, as in the case of context-related memory, state-dependent retrieval seems to apply only to free recall; recognition is not necessarily enhanced.

In sum, many different stimuli can serve as retrieval cues. Which ones do we actually use, and which are most helpful? According to the **encoding specificity principle** (Tulving & Thomson, 1973), this depends on what information we enter into memory in the first place. If, when learning some information, you encode certain aspects of your physical surroundings as part of the "package," these will later serve as useful retrieval cues. If your internal state is part of what is encoded, then this will later serve as an effective retrieval cue. The key point seems to be a close match between the conditions under which you first acquire some information and the conditions under which you attempt to recall it. The specific nature of individual retrieval cues seems to be of less importance.

KEY POINTS

- Information moves from short-term to long-term memory through elaborative rehearsal.
- The levels of processing view suggests that the greater the cognitive effort we expend in processing information, the better it will be remembered.
- Retrieval cues are stimuli that help bring to mind information stored in long-term memory.

FORGETTING FROM LONG-TERM MEMORY

When are we most aware of memory? Typically, when it fails—when we are unable to remember information that we need at a particular moment. Given this fact, it is not surprising that the first systematic research on memory, conducted by Ebbinghaus, was concerned with forgetting. As you may recall, Ebbinghaus experimented on himself and studied the rate at which he forgot nonsense syllables. The results of his investigations suggested that forgetting is rapid at first but slows down with the passage of time.

Encoding Specificity Principle: *The fact that only cues encoded at the time information is entered into memory can later contribute to the retrieval of such information.*

Modern research has generally confirmed Ebbinghaus's findings where meaningless materials such as nonsense syllables are concerned, but suggests that we are much better at remembering other and more meaningful types of information. For example, Bahrick (1984) asked college professors to identify the names and faces of former students who had taken a single course with them. Even after more than eight years, the professors were quite successful in recognizing the students' names and in matching their names with photos of them. Similarly, it is clear that many complex skills, such as swimming, driving a car, or riding a bicycle, are retained over long periods of time, even if we have little opportunity to practice them. In contrast, other skills—ones requiring associations between specific stimuli and responses, called discrete skills—are subject to much greater degrees of forgetting. Thus, a few months after learning how to perform a procedure for reviving heart attack victims, most individuals have forgotten many of the steps and actions it involves (McKenna & Glendon, 1985). And many other complex skills, such as typing, show a similar pattern. What, then, accounts for forgetting? Why is information firmly entered in long-term memory sometimes lost, at least in part, with the passage of time? Several explanations have been offered; here we'll focus on the two that have received the most attention. After that, we'll examine a sharply contrasting view of forgetting—*repression*—and its bearing on the tragedy of childhood sexual abuse (Loftus, 1993).

The Trace Decay Hypothesis: Forgetting with the Passage of Time

Perhaps the simplest view of forgetting is that information entered into long-term memory fades or decays with the passage of time. This suggestion is consistent with our informal experience: Often, information we acquired quite some time ago is more difficult to remember than information learned only recently. Yet considerable evidence suggests that decay is probably not the key mechanism in forgetting.

First, consider a famous study conducted by Jenkins and Dallenbach (1924). They asked two participants to learn a list of ten nonsense syllables. In one condition, both individuals then went directly to sleep. In another, they continued with their normal activities. The participants' recall of the nonsense syllables was tested after one, two, four, and eight hours. Results indicated that forgetting was more rapid when the participants stayed awake than when they went to sleep. These findings argue against the suggestion that forgetting is primarily the result of gradual decay of information over time.

Can you see any problems with this study that raise doubts about its seemingly straightforward results? Here's one: Participants who went to sleep learned the nonsense syllables in the evening; those who stayed awake learned them in the morning. Thus, differences in circadian rhythms may have played a role in the obtained results. Indeed, sleep during the day does not seem to reduce forgetting as reported by Jenkins and Dallenbach.

However, other research, in which animals have been kept awake but prevented from moving about and engaging in normal activities, also indicates that forgetting is not merely a matter of the passage of time. In one such study, for example, Minami and Dallenbach (1946) taught cockroaches to avoid a dark compartment by giving them an electric shock whenever they entered it. After the subjects had mastered this simple task, they were either restrained in a paper cone or permitted to wander around a darkened cage at will. Results again argued against the trace decay hypothesis: Roaches permitted to move about showed substantially more forgetting over a given period of time.

Forgetting as a Result of Interference

If forgetting is not a function of the passage of time and the weakening of materials stored in memory, then what *is* its source? The answer currently accepted by most psychologists focuses on *interference* between items of information stored in memory. Such interference can take two different forms. In **retroactive interference**, information currently being learned interferes with information already present in memory. If learning the rules of a new board game causes you to forget the rules of a similar game you learned to play last year, you are experiencing the effects of retroactive interference. In contrast, the second form of interference, **proactive interference**, occurs when previously learned information interferes with information you are acquiring at present. If information you have mastered about how to operate an old VCR interferes with your ability to operate a new one that has very different controls, you are experiencing the impact of proactive interference (see Figure 6.6).

A large body of evidence offers support for the view that interference plays a key role in forgetting from long-term memory (e.g., Tulving & Psotka, 1971). For example, in many laboratory studies, the more similar the words or nonsense syllables participants are to learn from different lists, the more interference among them, and the poorer the participants' ability to remember these materials (Gruneberg, Morris, & Sykes, 1988). What remains unclear, however, is precisely *how* interference causes forgetting. Does it actively push information out of memory? Or does it merely impede our ability to retrieve information? A final answer to such questions must await the completion of additional research.

Please see the **Point of It All** section on pages 232–233 for information about *repression*, which is a third potential cause of forgetting from long-term memory.

Retroactive Interference: *Interference with retention of information already present in memory by new information being entered into memory.*

Proactive Interference: *Interference with the learning or storage of current information by information previously entered into memory.*

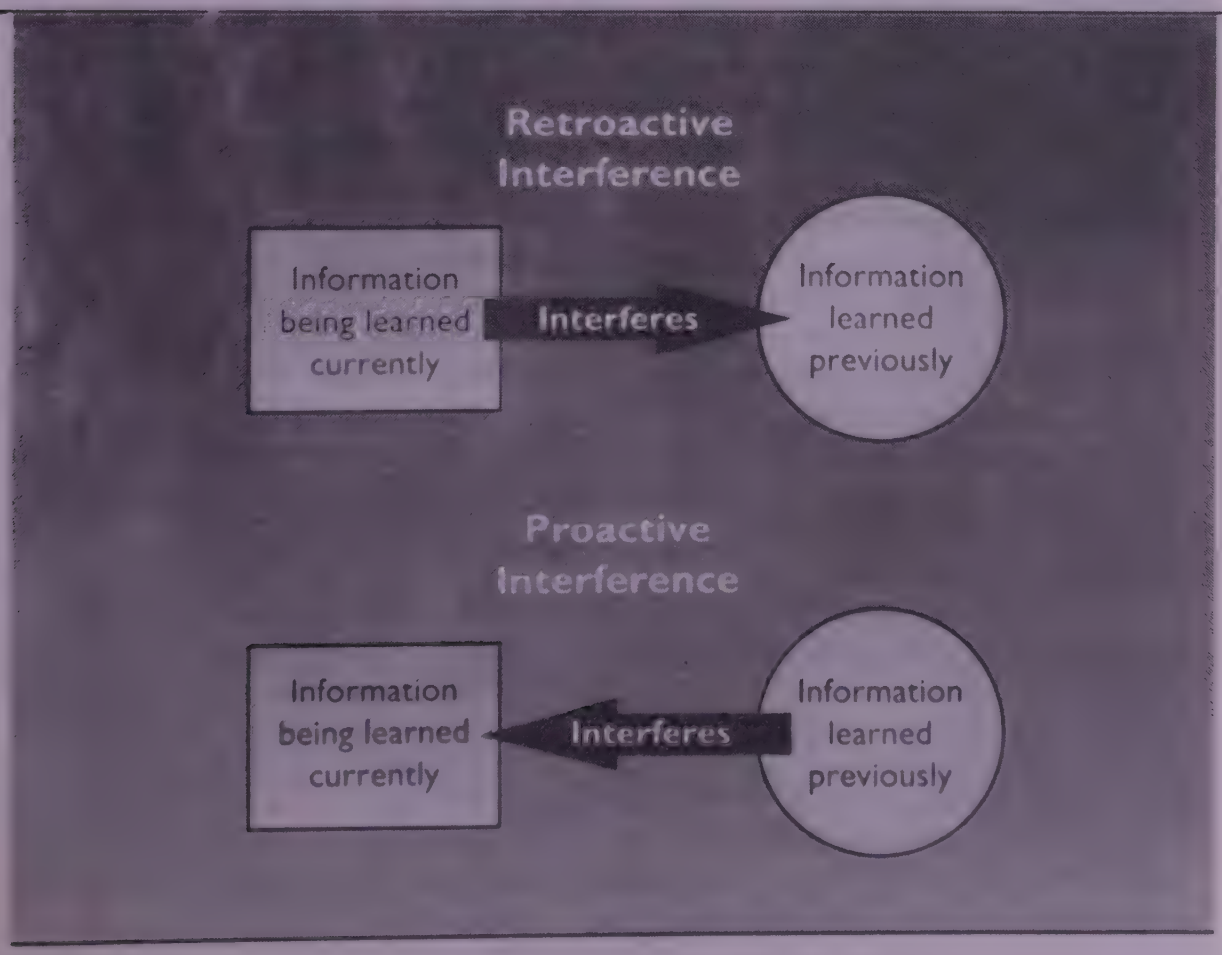


Figure 6.6

Retroactive and Proactive Interference: Important Factors in Forgetting

In *retroactive interference*, information currently being learned interferes with retention of previously acquired information. In *proactive interference*, information learned previously interferes with retention of new information.

Repression: Do We Sometimes Forget Because We Want to Forget?

In 1991, George Franklin Sr. was convicted of sexually attacking and then murdering an eight-year-old girl who was a friend of his daughter. The crime had occurred in 1969—more than twenty years earlier. How had he escaped prosecution for all these years, and why was he finally placed on trial so long after this tragic crime? The answer is that in 1990 his daughter Eileen came forward and accused her father of being the murderer. Further—and directly related to our discussion of forgetting—she claimed that she had not come forward sooner because she had not remembered these events until shortly before she made her accusations. How could she "forget" such traumatic events for so long a period?

One answer is provided by a third theory of forgetting from long-term memory—the theory of **repression**. According to this theory, which plays a key role in Freud's views of personality and mental illness (as we'll see in chapters 12 and 14), traumatic events such as the one described above are so shocking that all memory of them is forced from consciousness—*repressed*—into hidden recesses of the unconscious. There, the memories lie hidden until they are brought back into consciousness by some specific event, for example, by the probings of a therapist. In short, the theory of repression suggests that we forget certain information and experiences because we find them too frightening or threatening to bear.

The existence of repression is widely accepted by psychologists and psychiatrists, as well as by society generally (Loftus & Herzog, 1991). Thus, Eileen Franklin's charges carried great weight with the jury who tried her father—so much weight, in fact, that he was convicted primarily on this evidence.

Repression has featured prominently in many dramatic trials focusing on charges of *early childhood sexual abuse*. In these trials, repression has been offered as an explanation for the fact that the victims failed to remember these terrible experiences until many years after they occurred. Only when these individuals were exposed to careful questioning by trained therapists did memories of their abuse during early childhood come flooding back into consciousness. Such trials, and the accounts of the persons involved, certainly make for dramatic reading. Indeed, in recent years, many public figures—entertainers, famous athletes, and even Miss America—have reported the sudden emergence of traumatic memories of childhood abuse.

The growing frequency of these reports raises a question: Are the frightening "memories" always—or even usually—accurate? Did the persons who report them actually experience the devastating events? This is a complex question, because in many cases the alleged events occurred so long ago that concrete objective evidence of their occurrence is difficult to obtain. In addition, as noted by Loftus (1993), a leading expert on memory, there are several reasons for viewing at least some of these claims with a healthy degree of skepticism.

First, and most important, there is still very little scientific evidence for the existence of repression. Most support for the theory of repression derives from case studies. While these are often quite impressive, they do not, as we saw in chapter 1, generally provide conclusive evidence on the issues they address. Indeed, existing evidence for the existence of repression is so weak that one researcher (Holmes, 1990, p. 97) has suggested that use of the concept of repression in psychological reports should be preceded by the following statement: *"Warning: The concept of repression has not been validated with experimental research and its use may be hazardous to the accurate interpretation of behavior."*

REPRESSION AND MEMORY

In the 1991 trial of George Franklin, his daughter testified that she had witnessed the murder that took place more than twenty years earlier. She claimed that the memory had been repressed since the traumatic event took place.

Repression: *A theory of forgetting that suggests that memories of experiences or events we find threatening are sometimes pushed out of consciousness so that they can no longer be recalled.*

Second, the fact that many therapists believe strongly in the existence of repression and its role in psychological disorders indicates that in some instances, at least, therapists may act in ways that lead clients to report repressed memories even if they don't really have them. For example, a therapist who believes in the powerful impact of repressed memories might say something like this: "You know, in my experience a lot of people who are struggling with the same kind of problems as you had painful experiences as kids—they were beaten or even molested. I wonder if anything like that ever happened to you?" Faced with such questions and the *demand characteristics* they imply (refer to chapter 1), clients may begin to search their memories for traces of traumatic early events. This search, in turn, may sometimes lead them to generate memories that weren't there or to distort ones that do exist. As we'll see later in this chapter, growing evidence suggests that memories can be generated or altered in precisely this fashion (e.g., Haugaard, et al., 1991; Loftus & Coan, in press).

Third, even if they are not undergoing therapy and do not hear their therapist suggest repressed memories, many people may be influenced by media accounts indicating that both early sexual abuse and repressed memories of these experiences are quite common. Following exposure to such accounts, persons suffering from depression, sexual dysfunction, or other psychological problems may be all too ready to attribute these difficulties to traumatic childhood events that they can no longer remember.

I am not suggesting that repressed memories never exist or that they can't be accurate. There is certainly no doubt that childhood sexual abuse is a disturbingly frequent occurrence (Kutchinsky, 1992). However, there do seem to be sufficient questions concerning both the nature and the occurrence of repression, and sufficient evidence that even memories of traumatic events can be unintentionally fabricated, to suggest the need for caution. Many reports of repressed memories of early sexual abuse may indeed be accurate. But careful research indicates that memory is sometimes highly susceptible to distortion by misleading questions or false information (Loftus, 1992). Even worse, once such errors and distortions of memory occur, they may be accepted as truth by the person involved.

Thus, as Loftus (1993) has put it, we must careful to avoid letting false memories of early childhood abuse take on the certainty of unalterable fact. Falling into this trap, it seems, could ultimately be as dangerous and unfair to ostensible perpetrators as closing our eyes to the existence and frequency of abuse was, in the past, to its victims.

PROSPECTIVE MEMORY: Forgetting to Do What We're Supposed to Do

So far, we have focused on what can be termed *retrospective forgetting*—an inability to remember specific information entered into memory at an earlier time. Such forgetting is important, but often it is not the most annoying type we experience. Much worse, from this perspective, are those occasions on which we forget to keep an appointment or forget to perform some chore or errand we promised to complete. Such incidents involve **prospective memory**—remembering that we are supposed to perform some action at a certain time. Such memory has important practical implications. Missing an important meeting can have serious consequences for one's career; forgetting to take a prescribed medication at certain times of the day can adversely affect one's health (Ley, 1988).

Prospective Memory: *Remembering to perform certain activities at specific times.*

Why do we experience such forgetting? The answer seems to involve at least two factors. First, such forgetting is closely related to motivation. We tend to forget appointments or errands that are relatively unimportant to us or that we view as unpleasant burdens, while remembering the ones we judge to be important or pleasurable (Winograd, 1988). For example, many dentists have to phone their patients the day before to remind them of their appointments; whereas few hairdressers find this necessary.

Second, prospective memory, like other forms of memory, involves the impact of retrieval cues. We remember to perform those activities that we build into the structure of our days in such a way that we are reminded of them by various cues. Thus, we remember to go to the supermarket, the dry cleaners, and the bank on the way home by taking a route that passes each of these establishments; the route itself provides vivid reminders for prospective memory. Other cues we use for prospective memory are internal, relating to the passage of time (Harris & Wilkins, 1982). At first we check our watch or nearby clocks frequently, to "calibrate" our internal time-measuring mechanism. In the middle of the waiting period, we perform fewer checks. Later, as the time for performing some activity—such as removing a cake from the oven or departing for a meeting—approaches, we check clocks and watches with increasing frequency. The result: we have a continuing series of cues to remind us of the activity we must perform (Ceci, Baker, & Bronfenbrenner, 1988). If retrieval cues are absent, however, prospective memory may fail us.

KEY POINTS

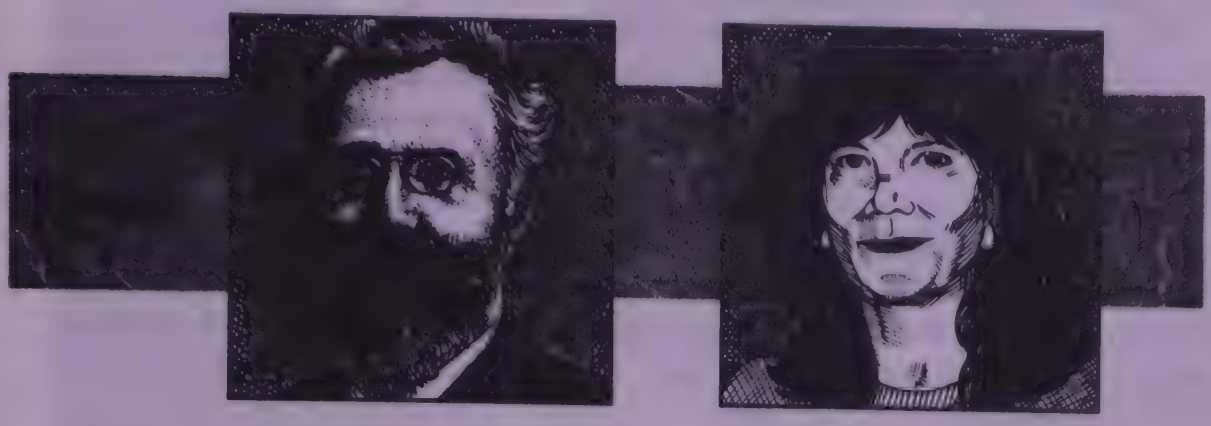
- Forgetting from long-term memory appears to result primarily from interference, not from the weakening of memories over time.
- In retroactive interference, information being learned now interferes with information already in memory.
- In proactive interference, information already in memory interferes with acquisition of new information.
- There is little direct evidence for the existence of repression. Individuals who suddenly "remember" painful events from long ago may not be providing accurate descriptions of actual events.
- Prospective memory is related to both motivation and the presence of retrieval cues.

MEMORY IN NATURAL CONTEXTS

Much of the research mentioned so far has involved the performance of relatively artificial tasks: memorizing nonsense syllables, lists of words, or lists of numbers. While we do have to remember some such items in real life, this kind of research seems fairly remote from many situations in daily life. In this section, we'll turn to the operation of memory in natural contexts and see how it operates in our daily lives (Loftus, 1991).

AUTOBIOGRAPHICAL MEMORY: *Remembering the Events of Our Own Lives*

How do we remember information about our own lives—*autobiographical memory*? Also known as *episodic memory*, this topic has long been of interest to psychologists and has been studied in several different ways. For example, Baddeley and his colleagues (Kopelman, Wilson, & Baddeley, cited in Baddeley, 1990) have developed an *Autobiographical Memory Schedule*, in which individuals are systematically questioned about different periods of their lives. Questions about childhood ask them to supply the names of their teachers and friends and addresses at which they lived and to describe incidents in their early lives. Additional questions are asked about other periods in their lives. The information obtained is then checked for accuracy against objective records, and in this way, the accuracy of autobiographical memory can be assessed.



Herman Ebbinghaus (1850–1908)

Using himself as the subject, Ebbinghaus developed systematic procedures for measuring memory. He was the first to plot a forgetting curve, a graph that shows the rate at which humans are able to retain lists of nonsense syllables after various intervals of time.

Elizabeth Loftus

Loftus is well known for her research in the areas of cognition, memory, eyewitness testimony, and psychology and the law. She advises students considering a career in psychology to "work closely with faculty mentors to get a good look at how they conduct their professional lives."

Key People in Memory

Diary Studies: Recalling the Daily Events of Our Lives Another technique for studying autobiographical memory involves efforts by individuals to keep detailed diaries of events in their own lives (Linton, 1975). In one such study, the Dutch psychologist Willem Wagenaar (1986) kept a diary for six years. On each day he recorded one or two incidents, carefully indicating who was involved, what happened, where it happened, and when it took place. He rated each incident in terms of whether it was something that happened frequently or rarely, and he also indicated the amount of emotional involvement he experienced. During the course of the study, he recorded a total of 2,400 incidents. Then he tested his own memory for each, over a period of twelve months. To do so, he took each incident and, after cueing himself with one piece of information, tried to recall the rest. Thus, he might provide the *who,* and then try to recapture the *what, where,* and *when.* Of course, he randomly selected the cue; for some incidents it involved *what,* for others *where,* and so on.

The findings Wagenaar (1986) reported are intriguing. First, he found that cues relating to who, what, and where were about equally effective in prompting memory. Information about when an incident took place, however, was far less useful. This not surprising. Can you remember where you were last June 12 or October 15? Probably not, unless these dates are personally significant for you—your birthday or anniversary, for instance. But you probably

have a much better chance of remembering where you were during a particular incident if you know whom you were with or what you were doing.

In addition, and as expected, Wagenaar found that the more cues he provided to himself, the more successful he was in answering correctly. Thus, if he knew who, what, and when, he was more successful in supplying the where than if he knew only who or what alone. He also found, again far from surprisingly, that incidents that were unusual, emotionally involving, or pleasant were easier to recall than ones that were unpleasant. Finally, he appeared to forget fewer items than did other persons who have conducted similar studies (e.g., Linton, 1975), perhaps because he used a more detailed procedure for recording incidents and remembering them—one that provided him with more retrieval cues.

Please keep in mind that there was only one subject in Wagenaar's (1986) study, and that the study was essentially observational in nature. As noted in chapter 1, while such research is often informative, it cannot establish causal relations or test hypotheses with the same degree of precision as experimentation. But Wagenaar's project, and the results of similar studies, indicate that autobiographical memory is affected by many of the same variables—such as retrieval cues and emotional states—that have been found to affect memory for abstract information presented under controlled laboratory conditions. This is valuable information in itself, and it suggests that further efforts to investigate autobiographical memory may indeed prove fruitful.

Memory for Times of Past Events: When Did You Do What You Remember Doing? Consider the following events:

Your last visit to the dentist
The most recent presidential election
Your most recent date
The last time you ate Chinese food
Your most recent midterm exam

Can you place these events in chronological order from the one that occurred earliest to the one that occurred most recently? Of course—in fact, this sounds like a very trivial request. But the fact that you can do this with such ease and certainty points to an important fact about autobiographical memory: It involves a strong sense of time. Looking back over our lives, we do not see a jumble of unrelated events. Rather, we perceive a "story" that unfolds in time, with one event following another. We have a sense of how long ago each event occurred—its distance from the present. We know its general location in the patterns of our life; for example, that it happened while we were in high school rather than college. And we know each event's relative position, whether it occurred before or after other events in our lives (Friedman, 1993).

How do we manage to keep track of time in this impressive manner? Research findings offer support for the following conclusions. As events occur, they are associated in memory with general contextual information and with other events. For example, consider your memories of your first date. At the time this event took place and information about it was entered into memory, it was associated with information about the environment (for example, you had just moved to a new house, it was a blazingly hot day) and about your own internal state (you were just recovering from the flu, you were feeling anxious about entering a new school), and so on. Later, when you think about your first date, you retrieve this contextual information along with information about the date. Since you know when you moved, that it is hot only in the summer, and that you tend to worry about the com-

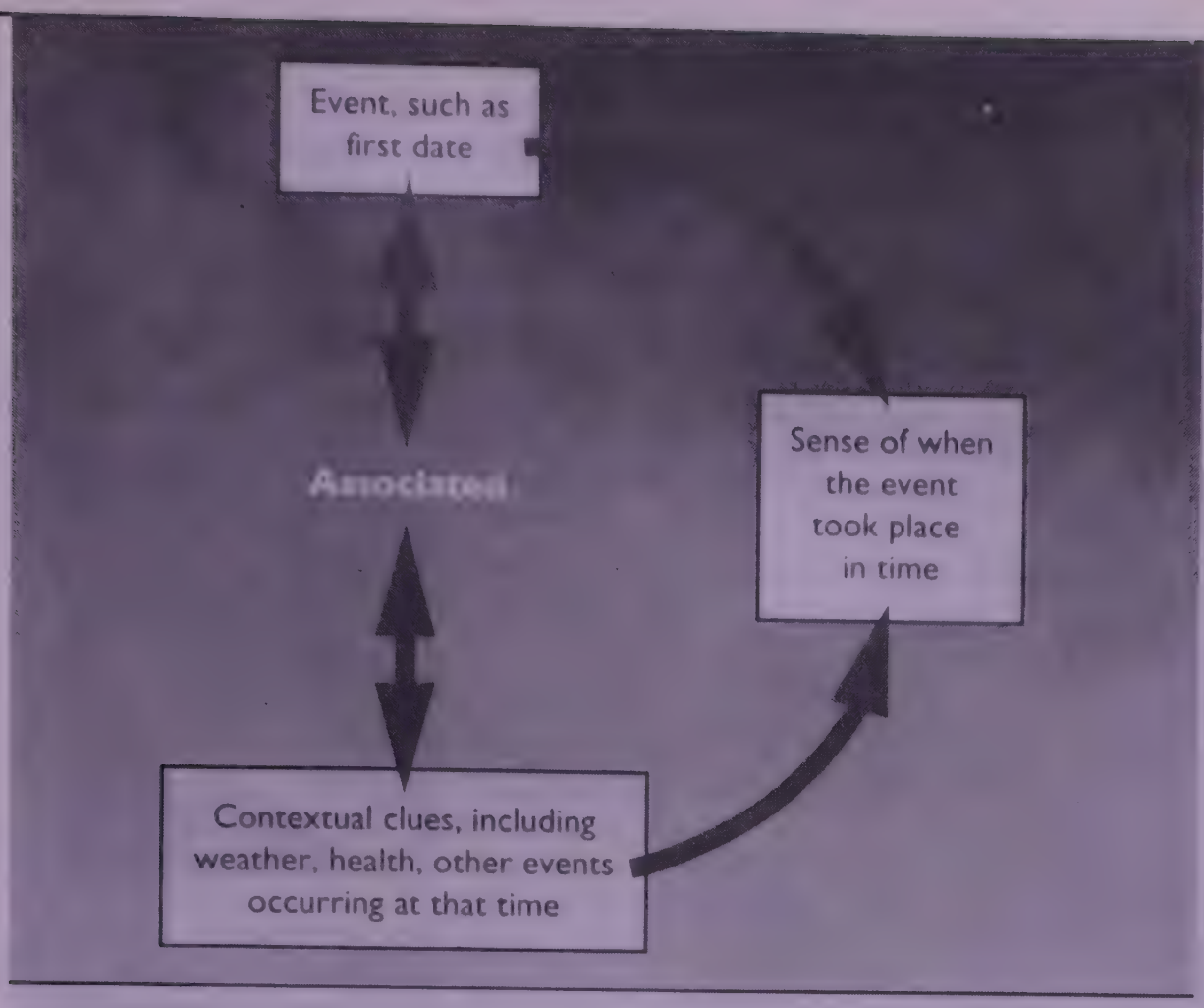


FIGURE 6.7

Memory for the Timing of Past Events

Research findings suggest that we keep track of the timing of events in our own lives by associating them with a broad range of contextual information. For example, we remember when our first date took place because it is associated with information about the weather on that day, the way we felt at the time, and other events in our lives. (*Source:* Based on suggestions by Friedman, 1993.)

ing school year only during August, you immediately have lots of useful information at your disposal (e.g., Brown, Shevell, & Rips, 1986; Friedman, 1993). And this kind of information forms the basis for our ability to determine fairly accurately the timing of past events (see Figure 6.7). Apparently, it is by examining past events in the context of a wealth of other information about our own lives and a rich knowledge of social, natural, and personal time patterns that we know when events took place. Please see the **Key Concept** feature (on page 238) for an overview of the different kinds of memory.

Infantile Amnesia: Forgetting the Events of Our Earliest Years

What is your earliest memory? If you are like most people, it probably dates from your third or fourth year of life, although some persons seem capable of recalling events that occurred when they were as young as two (Usher & Neisser, in press). This inability to recall events that happened to us during the first two or three years of life is known as **infantile amnesia** (Howe & Courage, 1993) and is, in one important sense, quite puzzling. It is obvious that we do retain information we acquired during the first years of life, for it is then that we learned to walk and to speak. Why, then, is autobiographical memory absent for this period? Why are we unable to recall events that happened to us at specific times and in specific places? Until recently, two explanations were widely accepted. According to the first, autobiographical memory is absent early in life because the brain structures necessary for such memories are not sufficiently developed at this time (Moscovitch, 1985). A second possibility involves the absence of language skills. Since we can't verbalize very effectively during the first two years of life, and since language plays a key role in long-term memory, it is not surprising that we cannot remember specific events from this period (Baddeley, 1990).

Infantile Amnesia: *Inability to remember the first two or three years of life, probably because we did not possess a well-developed self-concept during that period.*

More recent findings, however, suggest that neither of these explanations is entirely accurate. Contrary to widespread belief, infants appear to possess

Key Concept

Different Kinds of Memory: An Overview

Primary Memory Systems

Sensory Memory

Holds information from our senses for brief periods of time.

An image of a flash of lightning is held in visual sensory memory for just a fraction of a second.

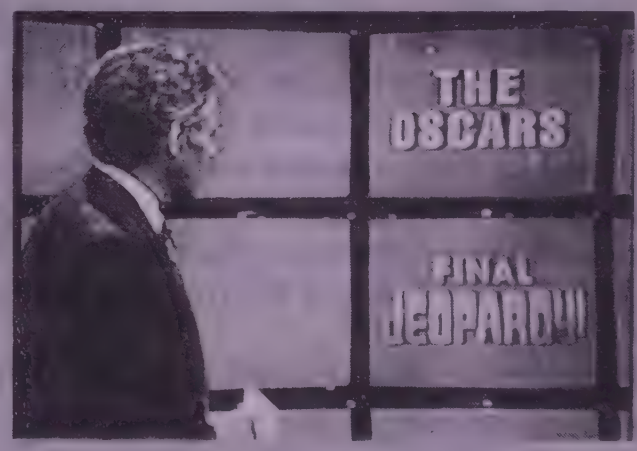
Short-Term Memory

Holds a limited amount of information—about seven to nine "chunks"—for short periods of time—less than a minute.

Short-term memory allows us to remember a phone number we have just looked up long enough to dial it.

Long-Term Memory

Holds seemingly unlimited amounts of information for long periods of time—perhaps indefinitely.



The wide range of information representing correct answers to quiz show questions is held in long-term memory.

Aspects of Long-Term Memory

Prospective Memory

Memory for actions that we are supposed to perform at a certain time.

Autobiographical Memory

Memory for information about our own lives including information about the *who, what, where,* and *when* of events we have experienced.

Memory for the Timing of Past Events

Memories for when various events in our own lives occurred.

Flashbulb Memories

Memories of where we were or what we were doing at the time of significant or unusual events.

relatively well-developed memory abilities. For example, as we'll see in chapter 8, babies can imitate actions shown by an adult even after a twenty-four-hour delay (Meltzoff, 1990). Similarly, they show considerable retention of both nontraumatic and traumatic events (e.g., Goodman et al., 1991).

In view of such findings, it does not seem reasonable to explain infantile amnesia in terms of infants' lack of memory abilities. What, then, does account for this phenomenon? According to Howe and Courage (1993), the answer lies in the fact that it is not until somewhere between our second and third birthday that most of us develop a clear *self-concept*. And without this concept, these researchers contend, we lack the personal frame of reference necessary for autobiographical memory. In other words, we cannot remember events that happened to us because we have no clear sense of ourselves as distinct individuals.

When do we acquire a clear self-concept? Not until we are about two years of age. Prior to this time, for example, babies show considerable interest in their own reflection in a mirror, but will not attempt to clean a spot of rouge that has been placed on their nose and is visible in their reflection. By the time they are eighteen months to two years of age, in contrast, they do attempt to clean the spot, thus indicating that they recognize their own physical features (Lewis et al., 1989).

In sum, recent evidence suggests that infantile amnesia may actually be a misleading term. Our inability to report autobiographical memories from the first few years of life seems to reflect the absence of a clearly defined self-concept during this period, *not* deficits in our memory systems. In light of this evidence, it may be more appropriate to refer to this gap in our autobiographical memories not as a period of infantile amnesia, but rather as a period of infantile nonself.

THE *CHALLENGER* EXPLOSION

For many of us, the tragic explosion of the space shuttle *Challenger* represents a *flashbulb memory*—we remember where we were and what we were doing when we heard the news in 1986. Can you think of other flashbulb memories?

FLASHBULB MEMORIES: MEMORIES THAT DON'T FADE—OR DO THEY?

Think back over the last year: What was the most surprising or unusual event that you can remember hearing about? (My personal choice: televised scenes of a large number of police cars following O. J. Simpson's white Bronco on the highways of Los Angeles.) Can you also remember what you were doing and where you were when you first learned about whatever event you choose? If so, then you have a personal, first-hand example of what Brown and Kulik (1977) term **flashbulb memories**—vivid memories of what we were doing at the time of an emotion-provoking event.

Are such memories accurate? Can we really remember what we were doing or where we were at the time of surprising events? Growing evidence suggests that this is one of those cases in which our subjective impressions concerning our own memory are wrong. The surprising thing about flashbulb memeories is not that they are so accurate but rather that they are actually quite inaccurate (Neisser, 1991). For example, in one study on this topic, students were asked, the day after the space shuttle *Challenger* exploded, how they had first heard this news. Three years later, the same persons were asked to recall this information again. Most were sure that they could remember; but in fact, about one-third of their accounts were completely wrong. Why do such errors occur? Perhaps because the strong emotions present when flashbulb memories are formed may interfere with accurate encoding, and so lead to later errors (Forgas & Bower, 1989). Whatever the mechanism, it is clear that flashbulb memories are another intriguing aspect of autobiographical memory.

KEY POINTS

- Autobiographical memory is memory of information about our own lives.
- Our inability to recall events from the first three years of life is often called infantile amnesia. This term is misleading, because memory does function during that period.
- Flashbulb memories—memories connected to dramatic events in our lives—are less accurate than we generally believe.

Flashbulb Memories: *Vivid memories of what we were doing at the time of an emotion-provoking event.*

Distortion and Construction in Memory of Natural Events

A friend who has seen a popular movie describes it to you. It sounds appealing so you go to see it. When you do, you discover that the plot is very different from what your friend described. Your friend changed, omitted, or even added important events to the story. What has happened? One possibility is that your friend's description of the film has fallen prey to two basic types of errors that frequently affect memory in natural contexts: *distortion*—alterations in what is remembered and reported—and *construction*—the addition of information that was not actually present or, in some cases, the creation of "memories" of events or experiences that never took place.

Distortion and the Influence of Schemas We have all had experience with memory distortion. For example, when we look back on our own behavior in various situations, we often tend to perceive it in a favorable light; we remember saying or doing things we feel we *should* have said or done, even if we didn't actually say or do them. Similarly, when thinking about other persons, we often remember them as closer to our stereotypes of the groups to which they belong than they actually are.

Distortions in memory also occur in response to false or misleading information provided by others. If someone's comments suggest some fact or detail that is not present in our memories, we may add that fact or detail to our memories (Loftus, 1992). Unfortunately, such effects often occur during trials, when attorneys pose *leading questions* to witnesses—questions that lead the witnesses to "remember" what the attorneys want them to. For example, an attorney might ask, "Was the intruder's mustache light or dark colored?"—suggesting that the intruder had a mustache. A witness may not remember a mustache, and in fact the intruder may not have had a mustache. But in response to this kind of question, a witness's memory may be distorted, and he or she may "remember" seeing a mustache. We'll return to such effects in our discussion of eyewitness testimony.

What accounts for memory distortions? In many cases, they seem to involve the operation of **schemas**—cognitive structures representing individuals' knowledge and assumptions about the world (Fiske & Taylor, 1991; Rumelhart, 1975). Schemas are developed through experience and act something like mental scaffolds, providing basic frameworks for processing new information and relating it to existing knowledge. A schema can also be viewed as a packet of information consisting of a fixed core and a variable component. For example, your schema for buying something in a store has as its fixed aspect the exchange of money for some product. In addition, it allows room for variability with respect to the amount of funds involved, the specific item purchased, and so on.

Once schemas are formed, they exert strong effects on the way information is encoded, stored, and then retrieved. These effects, in turn, can lead to important errors or distortions in memory. Perhaps such effects are most apparent with respect to encoding. Current evidence suggests that when schemas are initially being formed—for example, when you are first learning about the activities, roles, and responsibilities of being a college student—information inconsistent with the newly formed schema is easier to notice and encode than information consistent with it. Such inconsistent information is surprising and thus seems more likely to become the focus of attention. In contrast, after the schema has been formed and is well developed, information consistent with it becomes easier to notice and hence recall (Stangor & Ruble, 1989) (see Figure 6.8). It is the operation of schemas that, in part, accounts for the fact that in many cases we are more likely to notice and

Schemas: *Cognitive frameworks representing our knowledge about aspects of the world.*

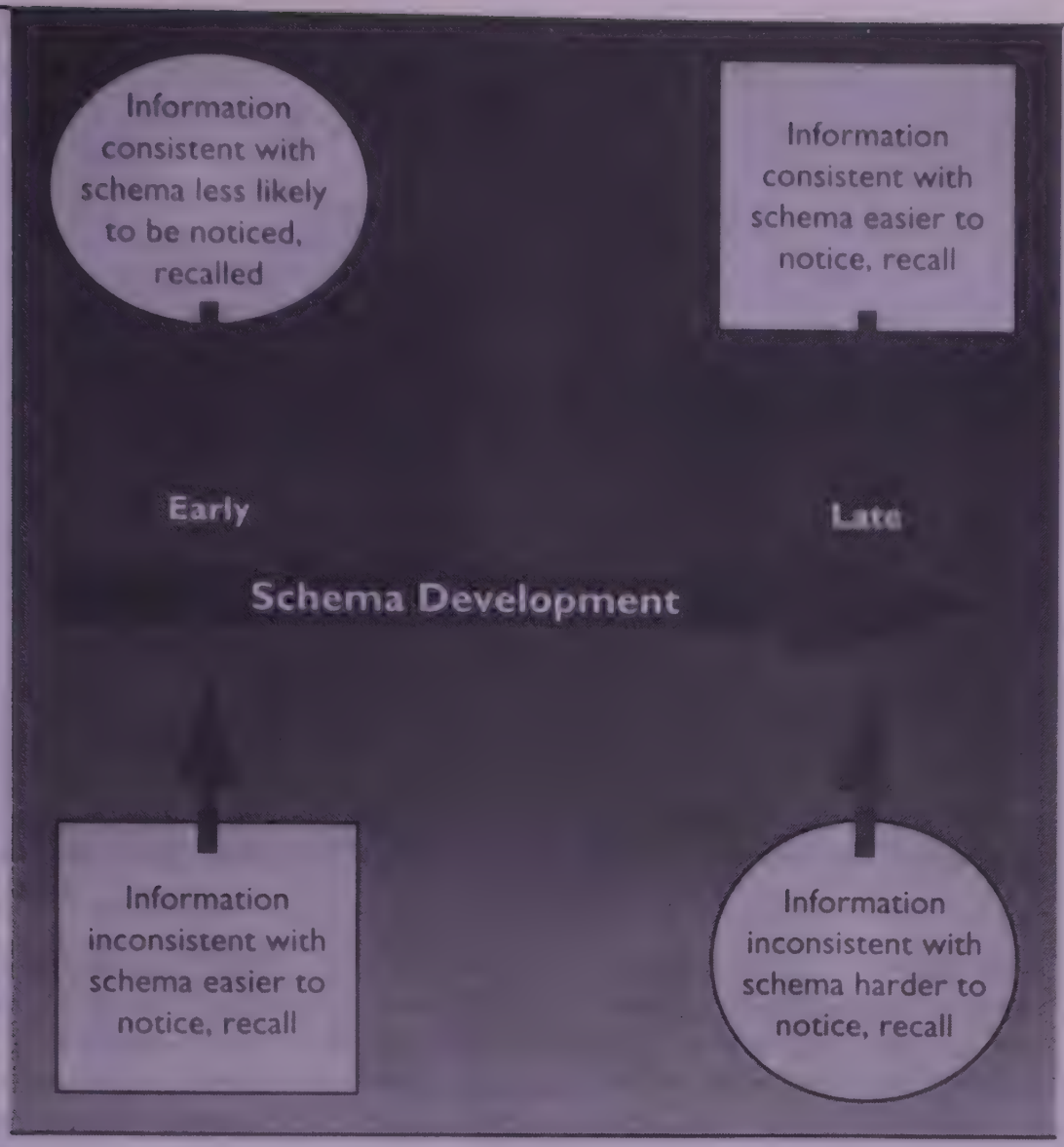


FIGURE 6.8

Schemas: How They Affect the Encoding of Information into Memory

When schemas are being formed, inconsistent information is easier to notice and encode than information that is consistent with the schemas. After schemas are well developed, however, the opposite is true.

remember information that supports our beliefs about the world than information that challenges them.

So, what role might schemas play in your friend's faulty account of the movie? Suppose the film is about a group of scientists working to discover a cure for a fatal disease, but one of the scientists is secretly working for a large drug company that wants to obtain the cure for its own use. Yet your friend fails to mention this crucial fact. Why? Perhaps because the idea of a scientist selling out for personal gain is inconsistent with your friend's strongly established schema for scientists. This may not be the cause of the error in this particular case, but it is indicative of the way in which schemas can lead to distortion in long-term memory.

Do people living in different cultures develop different schemas? And do such differences influence their memory? For information on these issues, see the **Perspectives on Diversity** section below.

PERSPECTIVES ON DIVERSITY

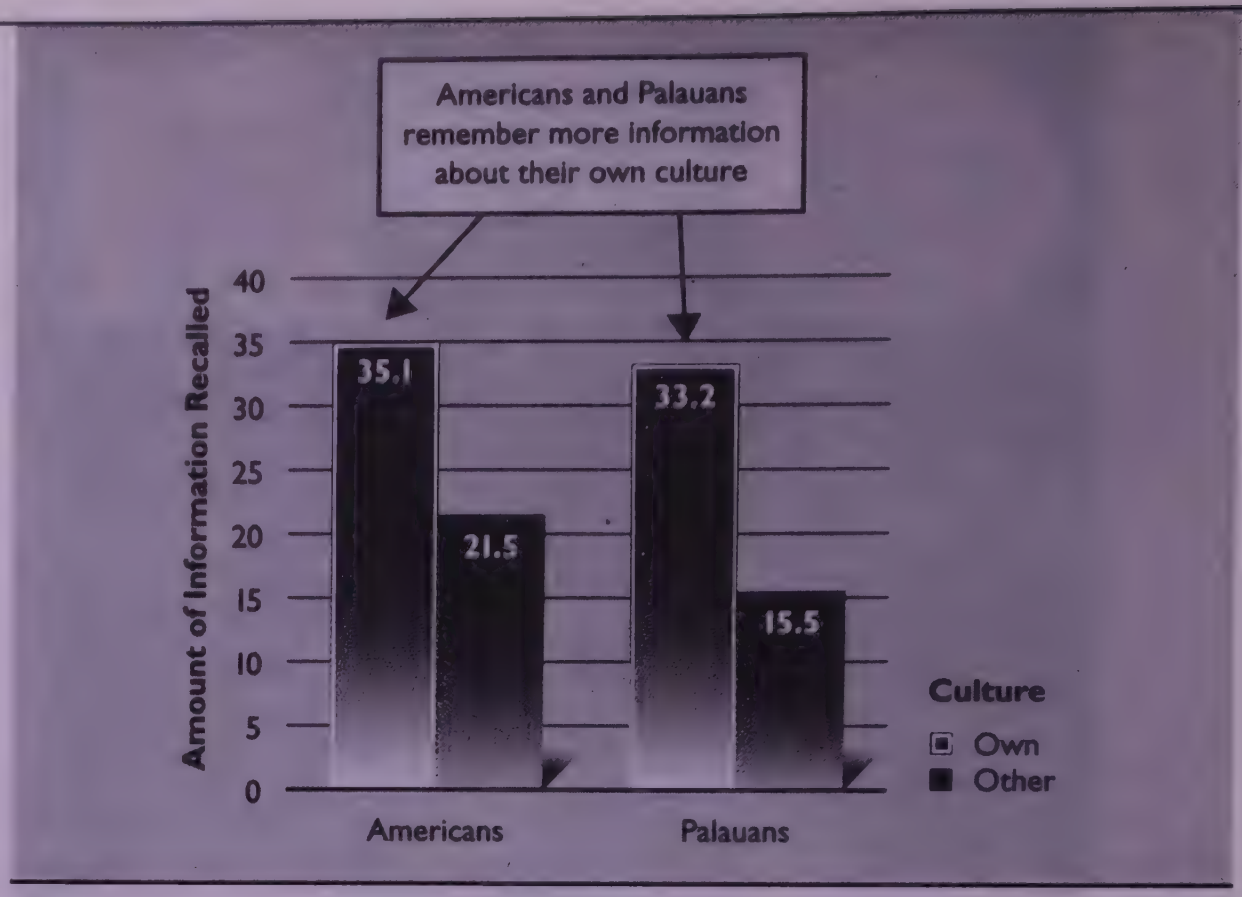
Culture and Memory: Remembering What Fits with Our Cultural Schemas

Schemas play an important role in memory and in human cognition generally. These mental frameworks are acquired through experience and, once formed, strongly influence what aspects of the external world get our attention,

FIGURE 6.9

Culture and Memory

After reading letters containing information about funerals in two cultures, persons from each culture remembered more information about their own culture than about the other one. These findings suggest that *cultural schemas* formed through experience with one's own culture can strongly influence what information is entered into long-term memory and later retrieved from it.
(*Source:* Based on data from Pritchard, 1991.)



what information gets entered into memory, and what is later retrieved from memory storage. Since schemas develop out of experience, it seems only reasonable to expect that they would reflect the cultures in which people live. People growing up in different cultures have different experiences in many areas of life, so their schemas for these areas, too, may differ. For example, persons raised in Western cultures may have very different mental frameworks for courtship, work relationships, and entertainment than persons raised in Asian or African cultures. And these contrasting schemas, in turn, may exert powerful effects on what people notice and remember in a given situation.

Direct evidence for the impact on memory of such culture-linked frameworks has been obtained in several studies (e.g, Shore, 1991). In one such investigation, for example, Pritchard (1991) asked high school students in the United States and in Palau (a small Pacific island nation) to read two letters written by a woman to her sister. In the letters the woman described events surrounding a typical funeral in each culture. Since funerals differ greatly in the United States and Palau, Pritchard expected that participants would find the letter about their own culture more familiar than the one about the other culture. Moreover, since information in the letter about their own culture would fit with their cultural schema for funerals, it would be easier for the students to enter that information into memory and to recall it at a later time.

To test this hypothesis, Pritchard (1991) asked the participants from both cultures to tell everything they could remember about the letters shortly after reading them. The number of distortions in participants' accounts were also scored. As shown in Figure 6.9, results provided clear support for the hypothesis that participants would find it easier to remember information relating to their own culture than information relating to an unfamiliar culture.

These findings, and those of many related studies (e.g., Segall et al., 1990) indicate that cultural factors do indeed play an important role even in such basic psychological processes as memory. The culture in which we grow up can strongly shape the mental frameworks we use to understand the world around us, and hence many important aspects of our behavior.

Memory Construction Unfortunately, distortion is not the only type of error that can affect memory of everyday events. Such memory is also affected by *construction:* our tendency to fill in the details when recalling natural events, or even to remember experiences we never actually had. I recently had a startling experience with construction in my own memory when I visited my parents. I asked my father what had become of my great-grandfather's uniform, the one he wore when he was a soldier in Europe in the 1890s. My father was puzzled and asked how I knew about the uniform. When I answered that I remembered seeing it on many occasions when I was a child, he reported that this was impossible: The uniform was thrown away when *he* was a teenager, many years before I was born. I was shocked, because I vividly recalled seeing it. I realize now, though, that despite what my memory told me (and still tells me!) I never laid eyes on it.

The mystery of my great-grandfather's uniform is fairly trivial, but the effects of memory construction can sometimes be far more important. For example, in a widely publicized court case, two young women accused their father, Paul Ingram of Olympia, Washington, of having sexually abused them for many years when they were children. Very little confirming evidence was available for the women's stories, and Ingram at first denied the charges. Under repeated questioning by police and attorneys, however, he began to report "recovered memories" of these crimes. Were these memories accurate? Or did Ingram construct them in response to the repeated suggestion that he had committed the crimes? To find out, a trained psychologist, Richard Ofshe, made up a completely false story in which Ingram forced his son and daughter to have sex (Loftus, 1993; Ofshe, 1992). Ofshe then presented this story to Ingram, urging him to try to remember these events. At first Ingram denied any knowledge of these events. But later he reported that he could remember them; indeed, he gradually developed detailed "memories" for events that were entirely fabricated!

This is a very dramatic illustration of the fact that under the power of suggestion, people may often construct memories of events that never took place (Loftus, 1993). Moreover, the occurrence of such memory construction is confirmed by many studies involving less traumatic events, such as people's remembering loud noises at night that never occurred (Weekes et al., 1992) or remembering that they voted in an election when they actually did not (Abelson, Loftus, & Greenwald, 1992). Unfortunately, young children seem to be especially susceptible to suggestions, readily constructing detailed memories of events that never took place when prompted by repeated questions from adults (Goleman, 1993). As you can see, this finding has important implications for cases in which children are either victims or witnesses of crimes such as sexual abuse.

What accounts for the occurrence of memory construction? One possible answer involves processes at work during encoding. When we enter information into memory, we may store the information itself but omit details about context—how and when the information was obtained. This may have been the case with my imagined memories of my great-grandfather's uniform. When I was a child, I heard many descriptions of it from my father and grandmother. Later, I remembered this information, but not the fact that it was based on verbal descriptions rather than on seeing the uniform itself.

Key Points

- Memory distortions arise for several reasons, including our tendency to perceive our own behavior in a favorable light, the influence of leading questions, misinformation from others, and the impact of schemas.
- Culture exerts strong effects on memory through the operation of cultural schemas.
- Memory construction can happen in response to suggestions from others, or when we fail to encode information about how and when information stored in memory was acquired.
- Eyewitness testimony is not as accurate or reliable as is widely believed.

Eyewitness Testimony: Information provided by witnesses to crimes or accidents.

Whatever the precise mechanisms involved, it is clear that under appropriate conditions—repeated prompting or questioning—people may construct memories of events that never occurred or experiences they never had. When this occurs in a court of law, the potential for injustice is truly disturbing. Please see the **Research Process** section below for more information on this important topic.

The Research Process

Eyewitness Testimony: How Accurate Is It? What Factors Affect It?

Memory distortion and construction are unsettling in any context, but in courts of law they can have disastrous consequences. **Eyewitness testimony**—evidence given by persons who actually witnessed a crime—plays an important role in many trials. At first glance, this makes a great deal of sense: After all, what better source of information about events could there be than persons who were actually on the scene? But are such accounts really accurate? After reading about the possibilities for error, distortion, and construction in memory for everyday events, you may now have some doubts.

If you do, these are well justified, for an increasing body of evidence suggests that, contrary to popular belief, eyewitness testimony is definitely *not* infallible. On the contrary, research (e.g., Loftus, 1992; Wells, 1993) indicates that eyewitnesses to crimes are often not nearly as accurate as the legal system generally assumes. They falsely identify innocent persons as the perpetrators of crimes (Wells, 1993); make mistakes about important details (Loftus, 1991); and even, as we noted earlier, report "remembering" events they did not see (e.g., Haugtvedt et al., 1991). As a result of such errors, innocent persons may be convicted of crimes they did not commit; and, conversely, persons guilty of serious crimes may erroneously be cleared of the charges against them. Indeed, recent findings indicate that the single largest factor accounting for such miscarriages of justice is eyewitness error (Wells, 1993).

These are discouraging and unsettling findings, to say the least. They lead to the following important question: Can anything be done to enhance the accuracy and usefulness of eyewitness testimony? Fortunately, growing evidence provides an affirmative answer.

Enhancing the Accuracy of Eyewitness Testimony: Specific Techniques

One promising approach to increasing the accuracy of eyewitnesses testimony focuses on improving the procedures used to question these persons (Geiselman et al., 1985). The results of this research indicate that witnesses' accuracy improves substantially when procedures based on current scientific knowledge of memory are employed. Techniques that appear to be useful include asking witnesses to report everything, even partial information, and asking them to describe events from several different perspectives and in several different orders, not just the one in which the events actually occurred. Research on memory suggests that these techniques should enhance recall, and indeed, when they are used, witnesses' accuracy increases by almost 50 percent in some cases (Fisher & Geiselman, 1988).

A related procedure involves asking eyewitnesses to imagine themselves back at the scene and to reconstruct as many details as possible (Malpass & Devine, 1981). This seems to provide witnesses with additional retrieval cues, and so enhances their memory. Finally, simply giving eyewitnesses repeated opportunities to recall the events they observed can sometimes help. This is especially helpful when the interval between the crime and the questioning is relatively brief (Roediger & Wheeler, 1993). Perhaps the most dramatic approach

Eyewitness Testimony: The Rodney King Trial

Eyewitness testimony plays an important part in many trials, including that of the L.A. police officers accused of beating motorist Rodney King. Unfortunately, growing evidence suggests that such testimony is less accurate than we may think.

to increasing the accuracy of eyewitness testimony, however, involves the use of *hypnotism*.

Hypnotism: Can It Really Enhance Eyewitnesses' Ability to Remember?

Chapter 4 discussed the relationship of hypnosis to memory. It has been suggested that people under hypnosis may be able to remember details and information they could not recall in their normal state of consciousness. Is this actually the case? Some dramatic incidents seem to suggest that it is. For example, in 1976 a busload of children and their driver were kidnapped at gunpoint. Later, after the driver had escaped and helped police rescue the children, he tried but failed to remember the license plate numbers of the kidnappers' vans. In an effort to improve his memory, he was hypnotized. Under hypnosis he did manage to remember most of the digits, and this led to the apprehension of the kidnappers (Kroger & Douce, 1979). Many other dramatic instances have also been reported in which hypnotism seemed to increase memory in this fashion.

Do these incidents prove that hypnotism works—that it is an effective aid to eyewitness testimony? Unfortunately, there is a large fly in the ointment: an absence of appropriate control groups in which eyewitnesses were *not* hypnotized. Without control groups, we can't tell whether memory was enhanced by (1) hypnosis or (2) other unrelated aspects of the process, such as the way in which eyewitnesses were questioned or instructions to them to "make a real effort" to remember. In fact, studies that have included control conditions have found it is these other procedures, not hypnotism, that enhance recall (Smith, 1983).

Another possibility is that hypnosis improves memory, but only for dramatic events such as a kidnapping or robbery. This possibility has been tested in several studies in which participants watched highly realistic films of various crimes and were then questioned under hypnosis or in their normal state (e.g., McEwan & Yuille, 1982). Again, results were disappointing: No differences were found between the hypnotized and unhypnotized groups.

All in all, it appears that hypnosis is not an effective technique for improving the memory of eyewitnesses to crimes. It may produce small increments in memory retrieval under highly specific conditions (for example, when the test of memory is delayed for at least a day; Bothwell, 1989). But in general, it seems fair to conclude that hypnosis promises more than it delivers with respect to memory enhancement.

Alcohol and Eyewitness Memory: Drugs and Accuracy Don't Mix

While research on eyewitness testimony has generally failed to confirm the widespread belief in the benefits of hypnosis, it has confirmed another view held by many people: Alcohol reduces eyewitnesses' accuracy. This is an important finding, because careful reviews of police files (e.g., Yuille & Cutshall, 1986) reveal that many eyewitnesses to crimes had consumed some alcohol at the time of the events on which they later reported. As noted earlier, alcohol seems to impair memory by interfering with the accurate encoding of information—its entry into memory—and eyewitnesses are no exception to this general rule. Indeed, a study by Yuille and Tollestrup (1990) indicates that even relatively small amounts of alcohol can interfere with accurate reporting of the details of a crime and can increase the likelihood that witnesses will falsely identify an innocent person as the culprit.

To conclude: eyewitnesses are not as accurate a source of information as the public, attorneys, police, and juries generally believe. Several techniques can assist eyewitnesses in bringing information they noticed and encoded to mind; but if such information has not been entered into memory, either because events unfolded too quickly for eyewitnesses to process them adequately or because of the influence of alcohol or other drugs, such techniques will probably not prove helpful. Thus, in many cases, it is best to view eyewitness testimony as an imperfect and potentially misleading source of information about reality.

The Biological Bases of Memory: How the Brain Stores Knowledge

Let's begin with a simple but compelling assumption: When you commit information to memory, something must happen in your brain. Given that memories can persist for decades, it seems reasonable to suggest that this "something" involves relatively permanent changes within the brain. Where, precisely, do these occur? And what kind of alterations are they? These ques-

tions have fascinated—and frustrated—psychologists and other scientists for decades. Only recently have even partial answers begun to emerge.

Amnesia and Other Memory Disorders: Keys to Understanding the Nature of Memory

The study of **amnesia**, or loss of memory, has added greatly to our understanding of the biological bases of memory. Amnesia is far from rare. Among human beings, it can stem from accidents that damage the brain, from drug abuse, or from operations performed to treat various medical disorders. Two major types exist. In **retrograde amnesia**, memory of events prior to the amnesia-inducing event is impaired. Thus, persons suffering from such amnesia may be unable to remember events from specific periods in their lives, such as events they experienced between the ages of eighteen and twenty-two. In **anterograde amnesia**, in contrast, individuals cannot remember events that occur *after* the amnesia-inducing event. For example, if they meet someone for the first time after the onset of amnesia, they cannot remember this person the next day, or even a few minutes after being introduced.

***H.M.* and the Role of the Medial Temporal Lobes** Let's begin with the dramatic case of H.M.—an individual whose amnesia has been studied by psychologists ever since the 1950s. In 1953, at the age of twenty-seven, H.M. underwent an operation to remove the medial portion of both temporal lobes of his brain. The reason for this operation was to stop seizures; H.M. suffered from an extreme form of epilepsy and was experiencing at least one major seizure each week. The operation almost completely cured H.M.'s seizures, but it produced both retrograde and anterograde amnesia (Milner, Corkin & Teuber, 1968). H.M.'s retrograde amnesia was relatively minor; he could remember all of the past with the exception of the most recent one or two years. His anterograde amnesia, however, was profound. For example, he could not remember people he met after his operation even if he encountered them over and over again. When his family moved to a new home, he could not find his way back to it, even after several months of practice. He could read the same magazine over and over again with continued enjoyment, because as soon as he put it down, he forgot what it contained.

H.M. seemed quite normal in many respects, however. He could carry on conversations, repeat seven numbers from memory, and perform simple arithmetic tasks without paper and pencil. Together, these findings suggested that both his short-term and long-term memory systems were intact. His major problem seemed to be an inability to transfer new information from short-term memory to long-term memory. As a result, it was as if he had become suspended in time on the day in 1953 when he regained his health but lost the ability to store new information. Additional evidence, obtained from studying H.M.'s performance on a wide range of tasks, points to a slightly different conclusion: He *can* transfer information from short-term to long-term memory (Graf & Schachter, 1985), but is incapable of noticing or reporting this fact.

What, precisely, does the case of H.M. tell us about the biological bases of memory? Since it was portions of his temporal lobes that were removed, these findings suggest that these lobes—or structures within them—play a key role in our memory systems. In particular, the temporal lobes seem to be crucial in the **consolidation of memory**: the process of shifting new information from short-term to longer-term storage. Research has confirmed this con-

Amnesia: *Loss of memory stemming from illness, accident, drug abuse, or other causes.*

Retrograde Amnesia: *The inability to store in long-term memory information that occurred before an amnesia-inducing event.*

Anterograde Amnesia: *The inability to store in long-term memory information that occurs after an amnesia-inducing event.*

Consolidation of Memory: *The process of shifting new information from short-term to long-term storage.*

clusion and has identified one structure in the temporal lobes—the *hippocampus*—as crucial in this respect.

Declarative Memory and the Hippocampus Earlier in this chapter, I drew a distinction between *semantic* and *episodic* memory on the one hand and *procedural* memory on the other. As I hope you'll recall, both semantic and episodic memory involve our ability to recall information that we know—to bring it into consciousness and, if necessary, to describe it. Procedural memory, in contrast, is the kind of memory on which skillful behaviors—everything from riding a bike to playing golf—are based. While we can't put the information stored in this kind of memory into words, we know quite well that we possess it. Where does the hippocampus, a portion of the temporal lobes, fit into the picture? Converging lines of research conducted with humans and animals point to the conclusion that the hippocampus plays a key role in the first two kinds of memory, which are often grouped under the term *declarative memory,* or **explicit memory**, since we can describe their contents verbally. However, the hippocampus does not seem to play a role with respect to the second type of memory, sometimes termed **implicit memory**. This latter memory system is related to other areas of the brain, specifically, the neocortex, striatum, and amygdala (Tulving & Schachter, 1990).

Many different forms of evidence offer support for this view of the potential role of the hippocampus in memory (Squire, 1991). Some of the most fascinating studies, however, have focused on people suffering from amnesia. Many amnesics, it turns out, have experienced damage to the hippocampus. And their performance on tasks involving declarative or explicit memory seems to suffer as a result of these injuries. In contrast, their ability to perform some tasks involving implicit memory is not impaired (Schachter, Church, & Treadwell, 1994). Such effects are clearly illustrated by a study conducted by Knowlton, Ramus, and Squire (1992).

The study was conducted with two groups of participants. One group consisted of amnesic patients who had suffered damage to the hippocampus. The other was a group of persons whose memory abilities were functioning normally. Procedures were identical for both groups. First, they were presented with strings of letters that had been constructed according to artificial grammatical rules; the rules indicated that only certain letters could follow others, just as in English the letter *q* is always followed by the letter *u*, never by the letter *i*. Participants were not informed about the rules until after they had seen all the strings of letters. Then they were told about the rules and were informed that they would see additional strings of letters. For each, they should try to judge whether it conformed or did not conform to the rules; some of the letter strings would conform, while others would not. After this, they were shown the grammatical letter strings again and were asked to indicate whether they recognized them and whether the items were similar to the ones they had seen before. Knowlton and her colleagues reasoned that participants could acquire knowledge of the grammatical rules without being able to verbalize them; in other words, such knowledge would be stored in *implicit* memory. However, being able to recognize specific combinations of letters or to indicate that they were similar to ones previously seen would involve *explicit* memory—knowledge of specific letter strings rather than a sense of the underlying rules governing them. Thus, if the hippocampus plays an important role in explicit but not in implicit memory, the amnesic persons should do as well as the control participants on the classification task (deciding whether the letter strings met the grammatical rules). However, amnesics would do worse than the control group on both the recognition and the similarity task. As shown in Figure 6.10 (on page 248), these predictions were confirmed.

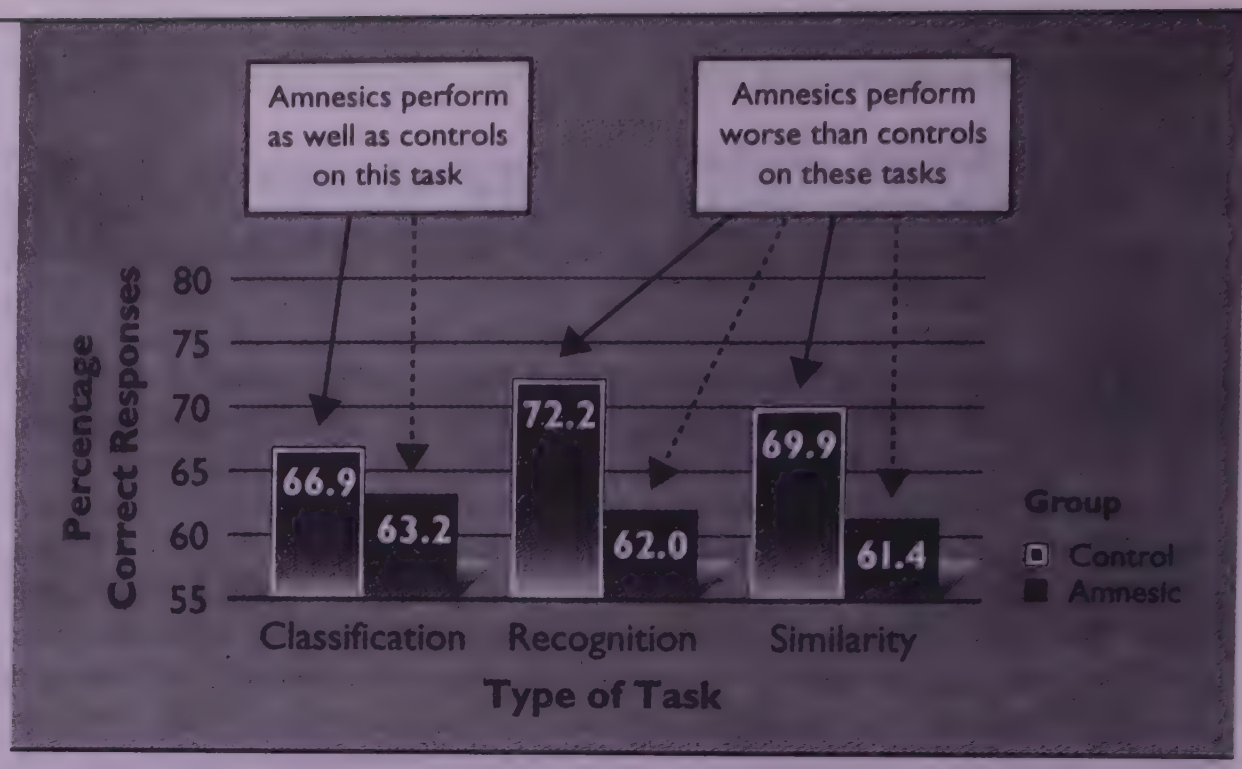
Explicit (Declarative) Memory: *A memory system that permits us to express the information it contains verbally. It includes both semantic and episodic memory.*

Implicit Memory: *A memory system that stores information that we cannot express verbally; sometimes termed procedural memory.*

FIGURE 6.10

Role of the Hippocampus in Explicit Memory

Amnesic patients who had suffered damage to the hippocampus performed as well as control persons (no damage to the hippocampus) on a task involving *implicit memory*. However, they did more poorly on tasks involving *explicit memory*. These findings indicate that the hippocampus plays an important role in explicit memory, but not in implicit memory.
(*Source:* Based on data from Knowlton, Ramus, & Squire, 1992.)



These findings, plus those of many other studies (Squire & McKee, 1992), suggest that we possess at least two distinct memory systems, and that different portions of the brain play a key role in each. But what, precisely, are the functions of the hippocampus in this respect? Additional evidence indicates that the hippocampus somehow binds together distributed sites of activation in the neocortex with activation in other regions of the brain, such as the medial temporal lobe. Such connections are needed for the formation of memories. When the hippocampus is damaged, these links cannot be formed. The result is that "out of sight" does equal "out of mind"—no lasting storage of information brought to us by our senses can occur. Interestingly, the role of the hippocampus in the formation of explicit memories appears to be a temporary one. Later, after information has been stored and retrieved repeatedly, the hippocampus is no longer needed for it to remain in memory. The precise nature of the changes within the nervous system that produce this shift, however, remains to be identified.

AMNESIA AS A RESULT OF KORSAKOFF'S SYNDROME Individuals who consume large amounts of alcohol for many years sometimes develop a serious illness known as **Korsakoff's syndrome**. The many symptoms of Korsakoff's syndrome include sensory and motor problems as well as heart, liver, and gastrointestinal disorders. In addition, the syndrome is often accompanied by both anterograde amnesia and severe retrograde amnesia: Patients cannot remember events that took place even many years before the onset of their illness. Careful medical examinations of such persons' brains after their death indicate that they have experienced extensive damage to portions of the diencephalon, especially to the thalamus and hypothalamus. This suggests that these portions of the brain play a key role in long-term memory. Convincing evidence for this conclusion is provided by the case of N.A.

Korsakoff's Syndrome: *An illness caused by long-term abuse of alcohol that often involves profound retrograde amnesia.*

N.A. was serving in the Air Force when he experienced a tragic accident. His roommate was making thrusts with a miniature fencing sword when N.A. suddenly turned around in his chair. The foil penetrated his right nostril and damaged his brain. The results of this accident were both immediate and striking. N.A. suffered extreme retrograde amnesia; he could not remember any events, personal or otherwise, from the past two years. What was the cause of his memory deficit? A brain scan revealed that N.A. had suffered

damage to the mediodorsal nucleus of the thalamus. (We discussed the nature of such scans in chapter 2.) While other causes of N.A.'s problem cannot be entirely ruled out, these findings suggest that the mediodorsal nucleus may play an important role in long-term memory.

MEMORY FAILURE: ALZHEIMER'S DISEASE

Damage to specific neurons in the brain is implicated in Alzheimer's disease, one of the most tragic illnesses to afflict older people.

THE AMNESIA OF ALZHEIMER'S DISEASE One of the most tragic illnesses to strike human beings in the closing decades of life is **Alzheimer's disease**. This illness, which afflicts some 5 percent of all people over sixty-five, begins with mild problems, such as increased difficulty in remembering names, phone numbers, or appointments. Gradually, however, patients' condition worsens until they become totally confused, are unable to perform even simple tasks like dressing or grooming themselves, and experience an almost total loss of memory. Indeed, in the later stages patients may fail to recognize their spouse or children. Careful study of the brains of deceased Alzheimer's patients has revealed that in most cases they contain tiny bundles of *amyloid beta protein*, a substance not found in similar concentrations in normal brains. Growing evidence (Yankner et al., 1990) suggests that this substance causes damage to neurons that project from nuclei in the basal forebrain to the hippocampus and cerebral cortex (Coyle, 1987). These neurons transmit information primarily by means of the neurotransmitter *acetylcholine*, so it appears that this substance may play a key role in the functioning of memory. Further evidence that such acetylcholine-based systems are crucial is provided by the fact that the brains of Alzheimer's patients contain lower than normal amounts of acetylcholine. In addition, studies with animal subjects in which the acetylcholine-transmitting neurons are destroyed suggest that this does indeed produce major dislocations in memory (Fibiger, Murray, & Phillips, 1983).

In sum, evidence obtained from the study of memory disorders indicates that specific regions and systems within the brain play central roles in our ability to transfer information from short-term to long-term storage and to retain it in long-term memory for prolonged periods of time.

MEMORY AND THE BRAIN: A Modern View

To return to the key questions: Where are memories stored within the brain? What changes within the brain underlie the long-term storage of information? With respect to the first question, the answer seems to be that information is stored in several different locations. Evidence indicates that there are at least two different storage systems within the brain—one for declarative or explicit memory and the other for procedural or implicit memory—and that different structures and regions are primarily associated with each. In addition, it appears that our brains process information simultaneously at several different locations rather than in a linear, step-by-step manner. If information processing occurs in several locations at once, it seems reasonable to assume that representations of the information exist in multiple places. So, again, where does the brain store specific memories? The most reasonable answer seems to be in multiple locations and in multiple forms.

Alzheimer's Disease: *An illness primarily afflicting individuals over the age of sixty-five and involving severe mental deterioration, including retrograde amnesia.*

Now for the second question: How, precisely, is such information actually stored? Apparently, through several subtle biochemical processes within the brain. It appears that the formation of long-term memories involves alterations in the rate of production or release of specific neurotransmitters. Such changes increase the ease with which neural information can move within the brain and may produce *localized neural circuits*. Evidence for the existence of such neural circuits, or *neural networks*, is provided by research in which previously learned conditioned responses are eliminated when microscopic areas of the brain are destroyed—areas that, presumably, contain the neural circuits formed during conditioning (Thompson, 1989). Long-term memory may also involve changes in the actual structure of neurons—changes that strengthen communication across specific synapses (Teyler & DeScenna, 1984). For example, there is some indication that after learning experiences, the shape of dendrites in specific neurons may be altered, and that these shifts may facilitate the neurons' responsiveness to neurotransmitters. Some of these changes may occur very quickly, while others may require considerable amounts of time. This, perhaps, is one reason why newly formed memories are subject to disruption for some period after they are formed (Squire & Spanis, 1984).

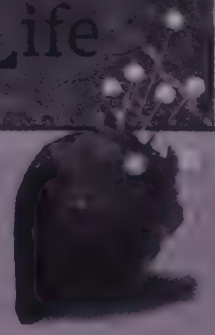
In sum, it appears that we are now entering an exciting period; armed with new and sophisticated research techniques, psychologists and other scientists may finally be able to unravel the biochemical code of memory. When they do, the potential benefits for persons suffering from amnesia and other memory disorders will probably be immense.

KEY POINTS

- The study of various memory disorders has provided important insights into the biological bases of memory.
- Retrograde amnesia is loss of memory of events prior to the amnesia-inducing event, while anterograde amnesia is memory loss for events that occur after this event.
- Growing evidence indicates that the hippocampus plays a crucial role in implicit memory, while other portions of the brain are important for explicit or declarative memory.
- The amnesia associated with Alzheimer's disease seems to result from damage to neurons that transmit information by means of the neurotransmitter acetylcholine.

Making Psychology Part of Your Life

Improving Your Memory: Some Useful Steps



How good is your memory? If you are like most people, your answer is probably "Not good enough!" At one time or another, most of us have wished that we could improve our ability to retain facts and information. Fortunately, with a little work, almost anyone can learn to remember more information more accurately. Systematic research on memory, such as that described in this chapter, offers several useful suggestions for accomplishing this goal. Here are some you can readily put to use.

1. *Really think about what you want to remember.* If you wish to enter information into long-term memory, it is important to think about it: ask questions about it, consider its meaning, and examine its relationship to information you already know. Doing so will help make the new information part of your existing knowledge frameworks and will increase the chances of its entry into long-term memory. This kind of thinking calls for considerable cognitive work, but it's worth the effort because it will increase your retention.

2. *Pay attention to what you want to remember.* Quick: Whose face appears on a ten-dollar bill? On a twenty? A fifty? If you live in the United States, you have seen these images many, many times, yet there is a good chance that you can't remember. Why? The answer is simple: You haven't paid close attention to this information. While you have certainly paid attention to the numbers on the corners of each of these bills each time

you have seen or had one, the faces in the center are another story. In any case, if you can't remember information such as this, to which you've been exposed on countless occasions, think how difficult it is to remember other information to which you direct little attention. The moral is clear: If you want to remember something, you must first make it the center of your attention.

3. *Use visual imagery.* You've probably heard the saying, "A picture is worth a thousand words." Where memory is concerned, this is sometimes true. Research indicates that it is often easier to remember information associated with vivid mental images (Gehring & Toglia, 1989; Pavio, 1969). If you wish to improve your memory, therefore, you can put this basic principle to use. In fact, imagery plays a central role in several well-known *mnemonics*, or strategies for improving memory. One of these, the *method of loci*, involves the following steps. Suppose you want to remember a series of points for a speech you will soon make. First, imagine walking through some familiar place, say your own home. Then form a series of images in which each item you wish to remember is placed in a specific location. Perhaps the first point is, "The greenhouse effect is a reality." You might imagine a large, steamy greenhouse containing plants right outside your front door. For the next point, "Destruction of the tropical rain forest is contributing to the greenhouse effect," you might imagine a large cut-down palm tree lying in your living room. And so on. Now, by taking an imaginary walk through your house, you should be able to see each of these images and so remember the points in your speech.

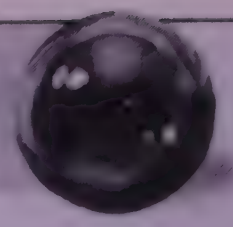
4. *Give yourself extra retrieval cues.* As I hope you remember, a key problem with long-term memory involves retrieving stored information. You can help yourself in this area through the use of retrieval cues. One type of cue is the *context* in which the information was first acquired. In other words, pause for a moment and try to remember the situations or surroundings in which you first entered the information into memory. Often, remembering the context will help you to retrieve the information you seek. For example, maybe you are attempting to remember the name of a restaurant. Try as you may, you can't bring the name to mind. If you pause and think about the location of the restaurant, how you first heard about it, what it looks like from the outside, the name may quickly follow.

5. *Develop your own shorthand codes.* You may have learned the names of the nine planets by means of a simple procedure known as the first-letter technique, in which the first letter of each word in a simple phrase stands for an item you wish to remember. In the case of the planets, one such phrase is "Mary's Violet Eyes Make John Stay Up Nights Pondering" (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto). This can be a very useful technique; indeed, more than half of first-year medical students report using it when studying anatomy (Gruneberg, 1978). If you need to remember lists of items, you can readily come up with your own sentences to represent them. And of course, the more meaningful or familiar a sentence is to you, the more helpful it will be.

6. *Develop your own cognitive scaffolds.* One basic finding of research on memory is that organized information is much easier to remember than unorganized information. If you wish to retain a large array of facts, dates, or terms, it is very helpful to organize them in some manner. Organization provides a framework to which new information can be attached—a kind of mental scaffold. This is one reason why each chapter of this book begins with an outline and ends with a detailed summary. Together, they provide the "big picture"—an overview of the chapter's content. And this in turn can be very helpful to you in your studying.

I could list additional techniques for enhancing your memory, but most would be related to the ones I've already described. Whichever techniques you select, you will find that making them work does require some degree of effort. In memory training, as in any other effort at self-improvement, the old saying "No pain, no gain" tends to hold true.

Summary and Review of Key Points



Human Memory Key Terms: memory, p. 216; encoding, p. 217; storage, p. 217; retrieval, p. 217; information-processing approach, p. 217; selective attention, p. 218; parallel distributed processing model, p. 218; semantic memory, p. 220; episodic memory, p. 220; procedural memory, p. 221	• Several models of human memory indicate that we possess three distinct memory systems: (1) Sensory memory represents sensory information present for very brief periods of time. (2) Short-term memory stores limited amounts of information for a few seconds. (3) Long-term memory retains huge amounts of information for long periods. • Evidence indicates that in at least some memory systems, information is processed in a parallel rather than in a step-by-step manner. • Several different types of information are stored in memory. Semantic memory holds general information about the world. Episodic memory holds information about our own life experiences. Procedural memory holds nonverbal information that allows us to perform various motor tasks such as riding a bicycle.
Sensory Memory Key Term: sensory memory, p. 221	• Sensory memory holds fleeting representations of our sensory experiences. These can be quite broad in scope, reflecting everything our senses tell us, but generally last less than one second.
Short-Term Memory Key Terms: short-term memory, p. 222; serial position curve, p. 222; chunk, p. 224	• Short-term or working memory retains information for a few seconds. Its existence is supported by the finding that words near the end of a list are remembered better than words near the middle presumably because those near the end are still in short-term memory—the serial position curve. • Additional evidence for the distinction between short-term and long-term memory is the finding that people have more difficulty keeping words or letters that sound alike in short-term memory than retaining ones that do not.
Long-Term Memory Key Terms: long-term memory, p. 224; tip-of-the-tongue phenomenon, p. 225; elaborative rehearsal, p. 225; levels of processing view, p. 226; retrieval cues, p. 228; context-dependent memory, p. 228; state-dependent retrieval, p. 228; encoding specificity principle, p. 229	• Information moves from short-term memory to long-term memory through a process of elaborative rehearsal. • The levels of processing view suggests that the more cognitive effort we expend in processing information, the better such information will be remembered. • Retrieval cues are stimuli associated with information stored in long-term memory; they help us bring such information to mind.
Forgetting from Long-Term Memory Key Terms: retroactive interference, p. 231; proactive interference, p. 231; repression, p. 232; prospective memory, p. 233	• Forgetting from long-term memory appears to result primarily from interference, not from the weakening of memories over time. • In retroactive interference, information being learned now interferes with information already in memory. In proactive interference, information already in memory interferes with acquisition of new information. • Although there is widespread belief in repression of traumatic memories, there is little scientific evidence for its occurrence. Individuals who suddenly "remember" painful events from long ago may not be providing accurate descriptions of actual events. • Prospective memory is related to both motivation and the presence of retrieval cues.

Memory in Natural Contexts Key Terms: infantile amnesia, p. 237; flashbulb memory, p. 239; schemas, p. 240; eyewitness testimony, p. 245	• Autobiographical memory is memory for information about our own lives. Diary studies in which individuals keep detailed records of events in their lives indicate that some kinds of information are more useful to us than others. • Our inability to recall events from the first three years of life is often called infantile amnesia. This term is misleading, because memory does function during that period. We cannot remember specific events during this time primarily because we do not yet possess a well-defined self-concept. • Flashbulb memories—memories connected to dramatic events in our lives—are less accurate than we generally believe. • Memory distortions arise for several reasons, including our tendency to interpret our own behavior in a favorable light, the influence of leading questions, and the impact of schemas. • Culture exerts strong effects on memory through the operation of cultural schemas. People generally find it easier to remember information relating to their own culture than information relating to other cultures. • Memory construction can happen in response to suggestions from others, or when we fail to encode information about how and when information stored in memory was acquired. • Because of memory distortion and construction and other factors, eyewitness testimony is not as accurate or reliable as is widely believed. However, several techniques can assist eyewitnesses in remembering information about crimes they observed.
The Biological Bases of Memory Key Terms: amnesia, p. 246; retrograde amnesia, p. 246; anterograde amnesia, p. 246; consolidation of memory, p. 247; explicit memory, p. 247; implicit memory, p. 247; Korsakoff's syndrome, p. 248; Alzheimer's disease, p. 249	• The study of various memory disorders has provided important insights into the biological bases of memory. Retrograde amnesia involves loss of memory of events prior to the amnesia-inducing event; anterograde amnesia is memory loss for events that occur after this event. • Growing evidence indicates that the hippocampus plays a crucial role in implicit memory, while other portions of the brain are important for explicit or declarative memory. • Retrograde amnesia in Korsakoff's syndrome reflects damage to portions of the thalamus. Amnesia associated with Alzheimer's disease seems to result from damage to neurons that transmit information by means of the neurotransmitter acetylcholine.

Critical Thinking Questions

Appraisal	At the present time, most psychologists accept the view that studying human memory from an information-processing perspective is very useful. Do you agree? Or do you believe that this view omits important aspects of memory?
Controversy	The concept of *repressed memories* has long enjoyed widespread acceptance among psychologists and the general public. Yet there is little research evidence for such effects. What are your views? Is continued belief in *repression* justified? Or should we discard this concept as being of little value?
Making Psychology Part of Your Life	Knowing something about how memory operates is very useful from one obvious perspective: It can suggest ways for you to improve your memory. But this is not the only way in which you can benefit from such knowledge. Can you think of others? (Hint: What does your new knowledge about memory tell you about trusting your own, even in situations where you are confident that it is accurate?)

Cognition:

Thinking, Deciding, Communicating

7

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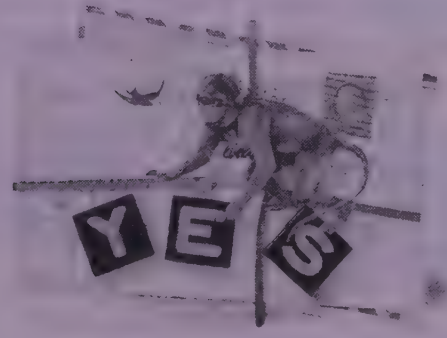


Have you ever wondered why some people are highly creative, whereas others are merely average? Will computers ever become as smart as people? Do animals think? These and related questions have to do with **cognition**—a general term used to describe various aspects of our higher mental processes. But creativity and thinking are only part of the picture where cognition is concerned. Have you ever agonized over an important decision, carefully weighing the advantages and disadvantages of potential alternatives? In all probability you have, perhaps in terms of selecting a college or choosing a major. To make the right decision you probably *thought* long and hard about

the various alternatives; you tried to *reason* your way to a conclusion about their relative merits; and finally you made some sort of *decision*. We perform these activities many times each day, and in a variety of contexts. It is on these and related issues that we'll focus in this chapter.

We'll begin our discussion by examining the nature of *thinking*, an activity that involves the manipulation of mental representations of various features of the external world. Thinking includes *reasoning*—mental activity through which we transform available information in order to reach conclusions. We'll also look at an intriguing question that would definitely *not* have been included in this book ten years ago: Do animals think? Next, we'll turn to *decision making*, the process of choosing between two or more alternatives on the basis of information about them. Here we'll explore different factors that influence the decision-making process. Third, we'll examine several aspects of *problem solving*, which typically involves processing information in various ways in order to move toward desired goals. Problem solving often calls for *creativity*—the formulation of new, and sometimes unexpected, perspectives and solutions. Finally, we'll examine an aspect of cognition that provides the basis for much of the activity occurring in each of the processes listed so far: *language*. It is through language that we can share the results of our own cognition with others and receive similar input from them. We'll also consider new evidence suggesting the possibility that other species may also possess several basic elements of language.

HAVE YOU EVER AGONIZED OVER AN IMPORTANT DECISION, CAREFULLY WEIGHING THE ADVANTAGES AND DISADVANTAGES OF POTENTIAL ALTERNATIVES?

One additional point before we begin this chapter's discussion: As we'll soon see, our abilities to think, reason, make decisions, and use language are impressive in many respects. But they are far from perfect. As is true for memory, the cognitive activities are subject to many forms of error: When we think, reason, make decisions, solve problems, and use language, we do not always do so in ways that would appear completely rational to an outside observer (Hawkins & Hastie, 1990; Johnson-Laird, Byrne, & Tabossi, 1989). As we examine each aspect of cognition, therefore, I'll call attention to these potential sources of distortion, because understanding the nature of such errors can shed important light on the nature of the cognitive processes they affect (Smith & Kida, 1991).

THINKING: Forming Concepts and Reasoning to Conclusions

Cognition: The activities involved in thinking, reasoning, decision making, memory, problem solving, and all other forms of higher mental processes.

What are you thinking about right now? If you answer this question, it's safe to say that at least to some extent you are thinking about the words on this page. But perhaps you are also thinking about a snack, the movie you saw last night, the argument you had with a friend this morning—the list could be endless. At any given moment, consciousness contains a rapidly shifting pattern of diverse thoughts, impressions, and feelings. In order to try to understand this complex and ever-changing pattern, psychologists have often adopted two main strategies. First, they have focused on the basic elements of thought—how, precisely, aspects of the external world are represented in our thinking. Second, they have sought to determine the manner in which we *reason*—how we attempt to process available information cognitively in order to reach specific conclusions.

Basic Elements of Thought: Concepts, Propositions, Images

What, precisely, does thinking involve? In other words, what are the basic elements of thought? While no conclusive answer currently exists, it appears that our thoughts consist largely of three basic components: *concepts*, *propositions*, and *images*.

Concepts: Categories for Understanding Experience What do the following objects have in common: apples, oranges, cherries? You probably have no difficulty in replying: They are all fruits. Now, how about these items: a Nissan Pathfinder, the B-1 bomber, an elevator? Perhaps it takes you a bit longer to answer, but soon you realize that they are all vehicles. The items in each of these groups look different from one another, yet in a sense you perceive—and think about—them as similar, at least in certain respects. The reason you find the task of answering these questions relatively simple is that you already possess well-developed concepts for both groups of items.

Concepts are mental categories for objects, events, experiences, or ideas that are similar to one another in one or more respects. Concepts play a central role in our task of understanding the world around us and representing it mentally. For example, imagine that in conversation a friend uses the term "Disk-Stack." You've never heard it before, so you ask what she means. When she replies, "It's software for increasing the amount of information you can put on a hard drive," you're home free. You already have a concept for "software" and immediately place this new term in that category. Now you can think about it quite efficiently: You know that it probably comes on a disk, that its contents can be stored in a computer, and that it helps accomplish certain tasks. In this and countless other situations, concepts allow us to represent a lot of information about diverse objects, events, or ideas in a highly efficient manner.

Artificial and natural concepts. Is a tomato a fruit or a vegetable? Many people would answer, "a vegetable." Botanists, however, classify it as a fruit, since it contains seeds and its structure is definitely more like that of apples and pears than those of potatoes and spinach. This fact illustrates the important distinction between what psychologists term artificial (or logical) concepts and natural concepts. **Artificial concepts** are ones that can be clearly defined by a set of rules or properties. Thus, a tomato is a fruit because it possesses the properties established by botanists for this category. Similarly, as you learned in geometry, a figure can be considered to be a triangle only if it has three sides whose angles add up to 180 degrees, and a figure can be a square only if all four sides are of equal length and all four angles are 90 degrees. Such artificial concepts are very useful in many areas of mathematics and science.

In contrast, **natural concepts** are ones that have no fixed and readily specified set of defining features. They are fuzzy around the edges. Yet they more accurately reflect the state of the natural world, which rarely offers us the luxury of hard-and-fast, clearly defined concepts. For example, consider the following questions:

Is chess a sport?

Is a pickle a vegetable?

Is a psychologist a scientist?

Is someone who helps a terminally ill person commit suicide a murderer?

Concepts: *Mental categories for objects or events that are similar to one another in certain respects.*

Artificial Concepts: *Concepts that can be clearly defined by a set of rules or properties.*

Natural Concepts: *Concepts that are not based on a precise set of attributes or properties, do not have clear-cut boundaries, and are often defined by prototypes.*

PROTOTYPES AND NATURAL CONCEPTS

Prototypes are the best or clearest examples of concepts. For the concept *art*, which of the examples shown here is more prototypical?

As you can readily see, these all relate to common concepts: sport, vegetable, science, crime. But what specific attributes are necessary for inclusion in each concept? If you find yourself puzzled, don't be surprised: The boundaries of natural concepts are somewhat indistinct.

Such natural concepts are often based on **prototypes**—the best or clearest examples (Rosch, 1975). Prototypes emerge from our experience with the external world, and new items that might potentially fit within their category are then compared with them. The more attributes new items share with an existing prototype, the more likely they are to be included within the concept. For example, consider the following natural concepts: *clothing*, *art*. For clothing, most people think of items like shirts, pants, or shoes. They are far less likely to mention wet suits, mink coats, or coats of armor. Similarly, for art, most people think of paintings, drawings, and sculptures. Fewer think of such artwork as the light show at Disney World.

In determining whether a specific item fits within a natural concept, then, we seem to adopt a *probabilistic* strategy. The more similar an object or event is to others already in the category, especially to the prototype for the category, the more likely we are to include the new item within the concept. In everyday situations, therefore, concept membership is not an all-or-nothing decision; rather, it is graded, and items are recognized as fitting within a category to a greater or lesser degree (Medin & Ross, 1992).

Concepts: How they are represented. That concepts exist is obvious. But how are they represented in consciousness? No firm answer to this question exists, but several possibilities have been suggested. First, concepts may be represented in terms of their features or attributes. As natural concepts are formed, the attributes associated with them may be stored in memory. Then, when a new item is encountered, its attributes are compared with the ones already present. The closer the match, the more likely is the item to be included within the concept.

A second possibility is that natural concepts are represented, at least in part, through **visual images**: mental pictures of objects or events in the exter-

Prototypes: *The best or clearest examples of various objects or stimuli in the physical world.*

Visual Images: *Mental pictures or representations of objects or events.*

nal world. When asked whether chess is a sport, did you conjure up an image of two players bending intently over the board while an audience looked on? If so, you can readily see how visual images may play a role in the representation of natural concepts. I'll have more to say about the role of such images in thought, later in this discussion.

Finally, it is important to note that concepts are closely related to *schemas*, cognitive frameworks that represent our knowledge of and assumptions about the world (please refer to chapter 6). Like schemas, natural concepts are acquired through experience and also represent information about the world in an efficient summary form. However, schemas appear to be more complex than concepts, contain a broader range of information, and may include a number of distinct concepts. For example, each of us possesses a *self-schema*, a mental framework holding a wealth of information about our own traits, characteristics, and expectations. This framework, in turn, may contain many different concepts, such as intelligence, attractiveness, health, and so on. Some of these are natural concepts, so the possibility exists that natural concepts are represented, at least in part, through their links to schemas and other broad cognitive frameworks.

To sum up, concepts may be represented in the mind in several ways. Whatever their precise form, concepts certainly play an important role in thinking and in our efforts to make sense out of a complex and ever-changing external world.

Propositions: Relations between Concepts Thinking is not a passive process; it involves active manipulation of internal representations of the external world. As we have already seen, the representations that are mentally manipulated are often concepts. Frequently, thinking involves relating one concept to another, or one feature of a concept to the entire concept. Because we possess highly developed language skills, these cognitive actions take the form of **propositions**—sentences that can stand as separate assertions. For example, consider the following propositions:

Politicians are often self-serving.

This is a very interesting book.

Frozen yogurt is not as sweet as ice cream.

Concepts play a key role in each: *politicians* and *self-serving* in the first; *book* and *interesting* in the second; *frozen yogurt*, *sweet*, and *ice cream* in the third. Moreover, each sentence indicates some kind of relationship between the concepts or between the concepts and one or more of their features. For example, for many people, self-serving is one feature of the concept *politician*. Research evidence indicates that much of our thinking involves the formulation and consideration of such propositions. Thus, propositions can be considered one of the basic elements of thought.

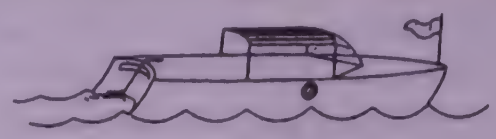
Images: Mental Pictures of the World Look at the drawing in Figure 7.1 (on page 260), and then turn back to this page. Now, answer the following questions:

1. Was there a flag? If so, in what direction was it fluttering?
2. Was there a handle attached to the rudder?
3. Was there a porthole? On which side of the boat?

Propositions: *Sentences that relate one concept to another and can stand as separate assertions.*

You probably answered all of these questions quite easily. But how? If you are like most people, you formed a visual image of the boat. Then, when asked about the flag, you focused on that part of your image. Next, you were

FIGURE 7.1



Mental Scanning of Visual Images

When shown a drawing such as this one and then asked questions about it, most people take longer to estimate the distance between the flag and the rudder than between the flag and the porthole.
(*Source:* Based on an illustration used by Kosslyn, 1980.)

asked to think about the rudder, at the opposite end of the boat. Did you simply jump to that end of the boat or scan the entire image? Research findings indicate that you probably scanned the entire image: After being asked about some feature near the front of the boat, most people take longer to answer a question about a feature near the back than to respond concerning a feature somewhere in the middle (Kosslyn, 1980). Such findings suggest that once we form a mental image, we think about it by scanning it visually just as we would if it actually existed. Other findings support this conclusion. For example, when asked to estimate distances between locations on a familiar university campus, the farther apart the places indicated, the longer people take to make their estimates (Baum & Jonides, 1979).

Other findings, however, indicate that our use of visual images in thinking is not precisely like that of actual vision (Pylyshyn, 1981). In one study, for example, participants were asked to imagine carrying either a cannonball or a balloon along a familiar route (Intons-Peterson & Roskos-Ewoldsen, 1988). Not surprisingly, it took them longer to complete their imaginary journeys when carrying the heavy object. So perhaps we don't simply "read" the visual images we generate; if we did, participants in this study should have been able to move through the imagined route equally fast in both conditions. The fact that they could not indicates that visual images are actually embedded in our knowledge about the world, and are interpreted in light of such knowledge rather than simply scanned.

Whatever the precise mechanisms through which they are used, mental images serve important purposes in thinking. People report using them for understanding verbal instructions, by converting the words into mental pictures of actions; for increasing motivation, by imagining successful performance; and for enhancing their own moods, by visualizing positive events or scenes (Kosslyn et al., 1991). Clearly, then, visual images constitute another basic element of thinking.

KEY POINTS

- Concepts are mental categories for objects, events, or experiences that are similar to one another in one or more respects.
- Artificial concepts can be clearly defined by a set of rules or properties. Natural concepts cannot; these usually are defined in terms of prototypes, or the most typical category members.
- Propositions, sentences that can stand as separate assertions, are useful for relating one concept to another, or one feature of a concept to the entire concept.
- Images, mental pictures of the world, are a basic element of thinking.

REASONING: Transforming Information to Reach Conclusions

One task we often face in everyday life is **reasoning**: drawing conclusions from available information. More formally, reasoning involves cognitive transformations of appropriate information in order to reach specific conclusions (Galotti, 1989). How do we perform this task? And to what extent are we successful at it—in other words, how likely are the conclusions we reach to be accurate or valid?

Reasoning: *Cognitive activity that transforms information in order to reach specific conclusions.*

Syllogistic Reasoning: *A type of formal reasoning in which two premises are used as the basis for deriving logical conclusions.*

FORMAL VERSUS EVERYDAY REASONING First, it's important to draw a distinction between *formal reasoning* and what might be described as *everyday reasoning*. In formal reasoning, all the required information is supplied, the problem to be solved is straightforward, there is typically only one correct answer, and the reasoning we apply follows a specific method. One important type of formal reasoning is **syllogistic reasoning**—reasoning in which

conclusions are based on two propositions called premises. For example, consider the following syllogism:

Premise: All people who love chocolate are extremely kind.
Premise: Saddam Hussein loves chocolate.
Conclusion: Therefore, Saddam Hussein is extremely kind.

Is the conclusion correct? According to the rules of formal reasoning, it is. But you may find it hard to accept—and the problem should be obvious. At least one of the premises is incorrect: There is no strong evidence that all people who love chocolate are extremely kind. This simple example illustrates an important point: Formal reasoning can provide a powerful tool for processing complex information, but *only* when its initial premises are correct.

In contrast to formal reasoning, *everyday reasoning* involves the kind of thinking we do in our daily lives: planning, making commitments, evaluating arguments. In such reasoning some of the premises are implicit, or unstated. Others may not be supplied at all. The problems involved often have several possible answers, which may vary in quality or effectiveness; and the problems themselves are not self-contained—they relate to other issues and questions of daily life. For example, imagine that you have a problem with your next-door neighbor. You and your neighbor share a driveway leading to your garages. It is narrow, so only one car at a time can pass. Lately, your neighbor has taken to parking her car midway down the driveway, next to her side door. This prevents you from putting your own car in your garage. You begin to reason about this situation in order to understand why your neighbor is doing this. One potential premise might be "She has been quite ill lately"; a second might be "People who are ill are weak and don't want to walk a lot." These could lead to the conclusion "Although she is a nice person, she is too ill to be considerate." Other premises, however, are also possible: "She has been quite ill lately" coupled with "But she has gotten a lot better" and "People who look as healthy as she does don't mind walking." Your conclusion then might be quite different: "She is using her recent illness as an excuse for being irresponsible."

Notice that in this situation, the premises are not specified for you, as in syllogisms; you must generate them for yourself. And many different premises are possible. The ones you choose will probably depend on numerous factors, including your recent experiences with other neighbors, with people who are ill, and so on. Finally, when you do reach a conclusion, it is not easy to determine whether it is correct or whether others, too, might be accurate.

Everyday reasoning, then, is far more complex and far less definite than formal syllogistic reasoning. Since it is the kind we usually perform, however, it is worthy of careful attention. This brings up an intriguing question: Do people from different cultural backgrounds reason in similar ways? As we'll see in the **Perspectives on Diversity** section below, cultural factors *do* seem to play an important role.

Perspectives on Diversity

When Culture Shapes Reasoning—or At Least Influences Its Outcomes

Most people in Western cultures, where formal rules of logic are routinely taught in school, can solve simple syllogisms quite successfully. However, this is not necessarily true of persons raised in other cultures. For

CULTURE AND REASONING

When researchers asked Moscow University students to complete syllogisms, few answered correctly. Why? One answer may be that Russian culture puts less trust in the laws of formal logic than Western cultures do.

example, in one study Scribner (1977) presented people from cultures where most persons could not read or write with syllogisms such as this one:

> All people who own houses pay house tax.
> Boima does not pay a house tax.
> Does Boima own a house?

Participants had a great deal of difficulty in answering, mainly because they refused to accept the premises at face value. They said that they did not know the person named and so could not tell whether he had a house but was avoiding paying taxes because he was related to the tax collector or really had no house. It's important to realize that participants' inability (or unwillingness) to answer in no way implies that they were less intelligent than people from other cultures; it merely suggests that they were unfamiliar with the rules of the syllogistic game.

Such effects have also been observed in cultures where most people are quite familiar with rules of formal logic. Solso (1991) presented students at a Moscow university with the following syllogism:

> Ivan and Boris always eat together.
> Boris is eating.
> What is Ivan doing?

Surprisingly, few of the students answered correctly ("Ivan is eating, too") immediately. Instead, many replied something like this: "How can I tell? I can't see him." This is precisely how many individuals from non-Western cultures replied when presented with the same type of situation (Cole & Scribner, 1974).

Why do participants in these studies answer this way? One explanation emphasizes the role of cultural factors in reasoning (Solso, 1991). Many cultures, it appears, view the laws of formal logic as less trustworthy or applicable than their own senses. Participants answer accordingly, by noting that they have no direct experience with the situation and so really can't answer intelligently. In short, cultural factors and beliefs can, and sometimes do, take precedence over formal rules of logic. What people say in such situations generally makes sense from the perspective of their own culture; ignoring this fact can lead to false conclusions about their abilities to reason clearly.

REASONING: SOME BASIC SOURCES OF ERROR How good are we at reasoning? Unfortunately, not as good as you might guess. Several factors, working together, seem to reduce our ability to reason effectively.

The role of emotion and beliefs. Growing evidence indicates that the way we feel—our current moods or emotions—can strongly affect various aspects of cognition (Forgas & Bower, 1988). So it is not surprising to learn that reasoning is often influenced by emotions and emotion-laden beliefs. For example, imagine that a person with deeply held convictions against the death penalty listens to a speech favoring capital punishment. Suppose that the arguments presented by the speaker contain premises the listener can't readily refute, and thus point to the conclusion that the death penalty is justified for the purpose of preventing further social evil. Yet the listener totally rejects this conclusion. Why? Because of his or her passionate beliefs and convictions against the death penalty, the listener may alter the meaning of the speaker's premises or "remember" things the speaker never really said. This, of course, serves to weaken the speaker's conclusion. Such effects can arise in many

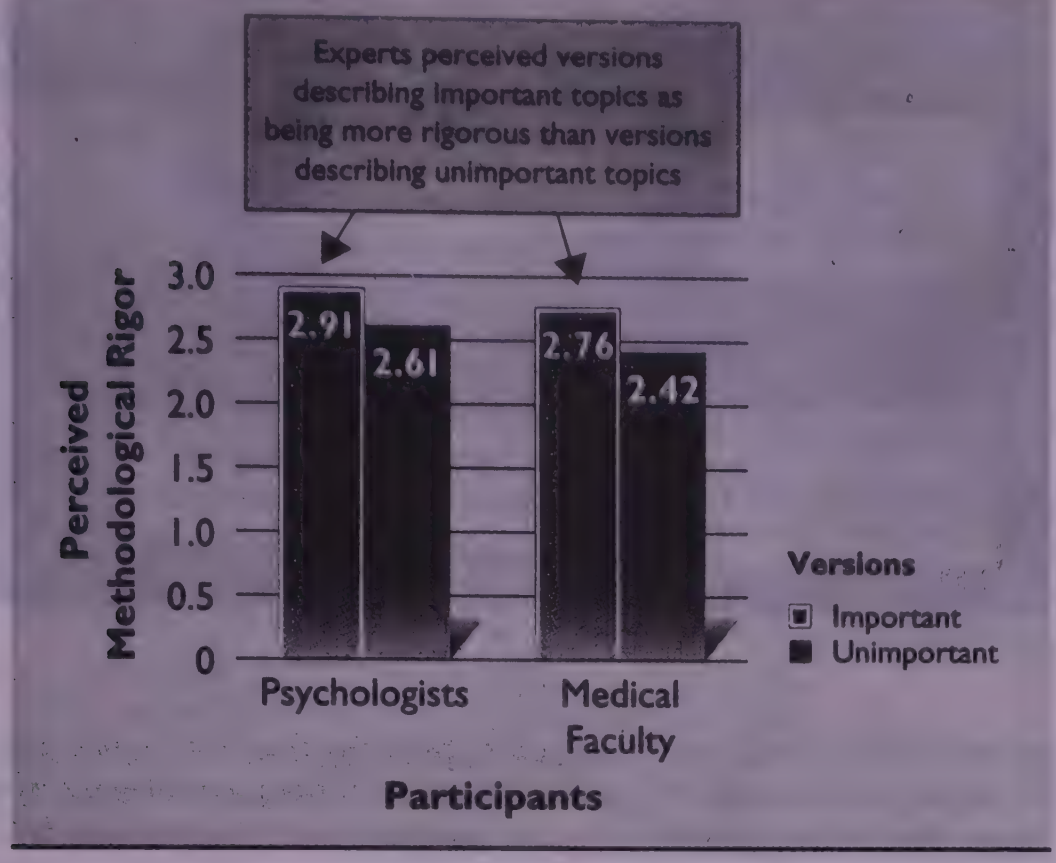


FIGURE 7.2

The Oversight Bias: Overlooking the Unimportant

The oversight bias seems to affect experts, too. As shown here, perceived importance of the topic greatly affected scientists' evaluations of the rigor of the research. Scientists rated the important versions higher than the unimportant versions in terms of their scientific rigor—despite the fact that both versions were equally flawed. (*Source*: Based on data from Wilson et al., 1993.)

ways. Whatever your views on this particular issue, the general principle remains the same: When emotions or powerful beliefs come face to face with logical arguments, it is often the latter that gives way. We'll consider the powerful effects of emotion again in chapter 10.

The oversight bias: Overlooking important information. During the 1992 presidential election, critics of then-candidate Bill Clinton were relentless in emphasizing his character flaws and relative inexperience in foreign policy. Supporters tended to ignore this information, instead focusing on positions he took on issues they perceived as more important, such as the status of this nation's economy. This example illustrates the **oversight bias**: We are selective in overlooking flaws, depending on the perceived importance of the issue at hand. Even experts, it seems, are prone to this type of oversight. In a recent study, Wilson et al. (1993) asked two groups of scientists to evaluate descriptions of several fictitious studies in terms of their scientific merit. All of the studies described contained obvious flaws. There were two versions of each study. Both versions were identical except that in one the topic of the study was *important* (the effects of alcohol on cardiovascular disease), whereas in the other the topic was relatively *unimportant* (the effects of alcohol on heartburn). As predicted by the oversight bias, the scientists rated descriptions of studies of important topics as having greater merit than descriptions of studies of unimportant topics—even though they were *equally* flawed (please refer to Figure 7.2).

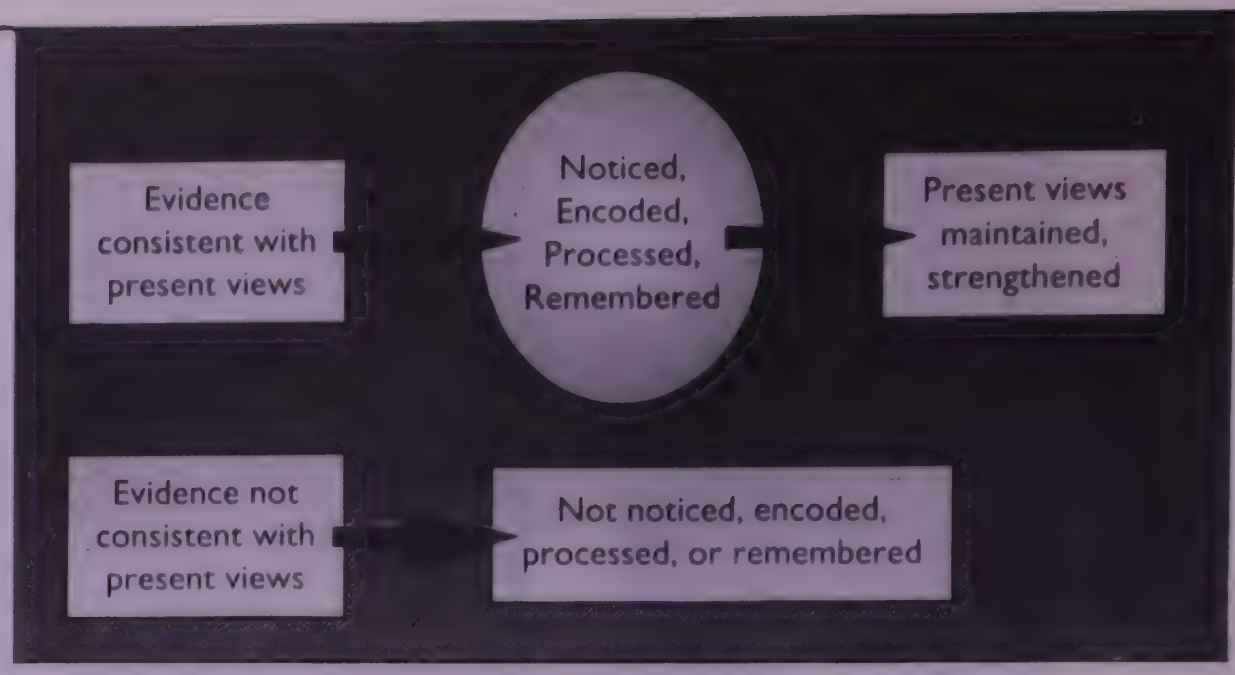
Oversight Bias: *The tendency to overlook flaws if the overall topic or issue is perceived as important.*

The confirmation bias: Searching for positive evidence. To illustrate another source of error in reasoning, let's consider our anti–death penalty person once again. Suppose that over several weeks this individual encounters numerous magazine articles; some report evidence confirming the usefulness of the death penalty, while others report evidence indicating that it is ineffective in terms of deterring crime. As you can readily guess, he or she will probably remember more of the information that supports the anti–death penalty view. In fact, there is a good chance that this person will read only

FIGURE 7.3

The Confirmation Bias

The confirmation bias leads individuals to test conclusions or hypotheses by examining primarily—or only—evidence consistent with their initial views. As a result, these views may be maintained regardless of the weight of opposing evidence.



these articles, or will read them more carefully than the ones arguing in favor of capital punishment. When this happens, it demonstrates the **confirmation bias**—our strong tendency to test conclusions or hypotheses by examining only, or primarily, evidence that confirms our initial views (Baron, 1988; Klayman & Ha, 1987). Because of the confirmation bias, individuals often become firmly locked into their conclusions; after all, this bias prevents them from even considering information that might call their premises, and thus their conclusions, into question (see Figure 7.3).

Hindsight: The "I knew it all along" effect revisited. Have you ever heard the old saying "Hindsight is better than foresight"? What it means is that after specific events occur, we often have the impression that we could have or actually did predict them. This is known in psychology as the **hindsight effect**: the tendency to think that we knew some event was likely to occur even before we learned that it had in fact taken place (Hawkins & Hastie, 1990). As you may recall from chapter 1, this is one reason some people believe that the findings of psychology are all just "common sense." After learning about these findings, they conclude that they "knew it all along."

A dramatic real-life illustration of the hindsight effect is provided by the launch of the Hubble space telescope in the spring of 1990. Shortly after the telescope reached orbit, it was discovered to have a serious defect. Within a few days of this discovery, several officials stated that they had known that this might happen all along; in fact, the problem resulted from a failure to conduct certain tests of the telescope that they had personally recommended. Were these individuals correct? Existing evidence on the hindsight effect casts considerable doubt on this possibility. In many studies, conducted in widely different contexts, learning that an event occurred causes individuals to assume that they could have predicted it more accurately than is actually the case (Fischoff, 1975; Mitchell, Russo & Pennington, 1989).

Confirmation Bias: *The tendency to pay attention primarily to information that confirms existing views or beliefs.*

Hindsight Effect: *The tendency to assume that we would have been better at predicting actual events than is really true.*

Can anything be done to counteract the hindsight effect? There are several possibilities. For example, if individuals are asked to explain a reported outcome along with other possible outcomes that did *not* occur, they are better able to recall their actual views before learning of the event, and this reduces the hindsight effect (Davies, 1987; Slovic & Fischoff, 1977). Other people may also reduce the hindsight effect by calling attention to the fact that others were surprised by the event and that it was indeed truly difficult to predict (Wasserman, Lempert, & Hastie, 1991). In sum, it does appear that we can combat our strong tendency to assume that we are better at predicting events

than is actually justified. To the extent that we avoid such tendencies, our ability to reason effectively may be enhanced.

Animal Cognition: Do They Really Think?

That human beings possess cognitive abilities, such as the abilities to think, reason, and plan, is obvious. But how about other species—do animals have similar abilities? So far, our discussions in this chapter have implied that cognitive processes are, for the most part, a human attribute. After all, it is difficult for most of us to picture animals thinking or performing other complex mental activities. And for many years this view prevailed among psychologists as well.

Several developments, however, have led scientists to reconsider their initial conclusions. For example, as discussed in chapter 5, behavioral researchers throughout this century have encountered many instances of animal learning that cannot be explained solely through conditioning processes (e.g., Tolman & Honzik, 1930; Capaldi & Miller, 1988). Also, growing evidence suggests that animals *do* form complex mental representations of their environments, a cognitive activity that helps them adapt to changing conditions they often face in nature (Cook, 1993; Shettleworth, 1993). Finally, earlier studies of animal cognition often used tasks designed to assess features of *human* cognition (Hulse, 1993); in other words, these procedures asked whether animals can do what people do. Scientists now concede that these procedures may not be optimal for studying the cognitive processes of animals (Hulse, 1993).

A more recent view—termed the *ecological approach*—focuses on how animals solve cognitive problems that are important to their survival; for example, finding their way around, assessing the status of food and other resources in the environment, and recognizing and avoiding danger when it is present (Shettleworth, 1993). In other words, the ecological approach tests for the presence of cognitive processes appropriate to a particular species. What has this approach told us about the cognitive processes of animals? As we'll see in the **Research Process** section below, quite a lot.

Key Points

- Reasoning involves transforming available information in order to reach specific conclusions. Formal reasoning derives conclusions from specific premises. In contrast, everyday reasoning is more complex and less clear-cut.
- Cultural factors and beliefs often take precedence over formal Western rules of logic.
- Reasoning is subject to several forms of error and bias. These include emotion, the oversight bias, the confirmation bias, and the hindsight bias.
- The ecological approach focuses on how animals use cognitive processes.

The Research Process

Animal Cognition: Tails of Intelligence

Recent developments have greatly changed psychologists' views of animal cognition—and of the appropriateness of methods used to assess these processes. Although it is apparent that animals differ from human beings in important ways, there are many similarities among species as well. Establishing commonality of cognitive processes in different animal species, however, requires the creation of comparable testing conditions (Wasserman, 1993).

Comparative Cognitive Processes: Establishing Equivalent Procedures

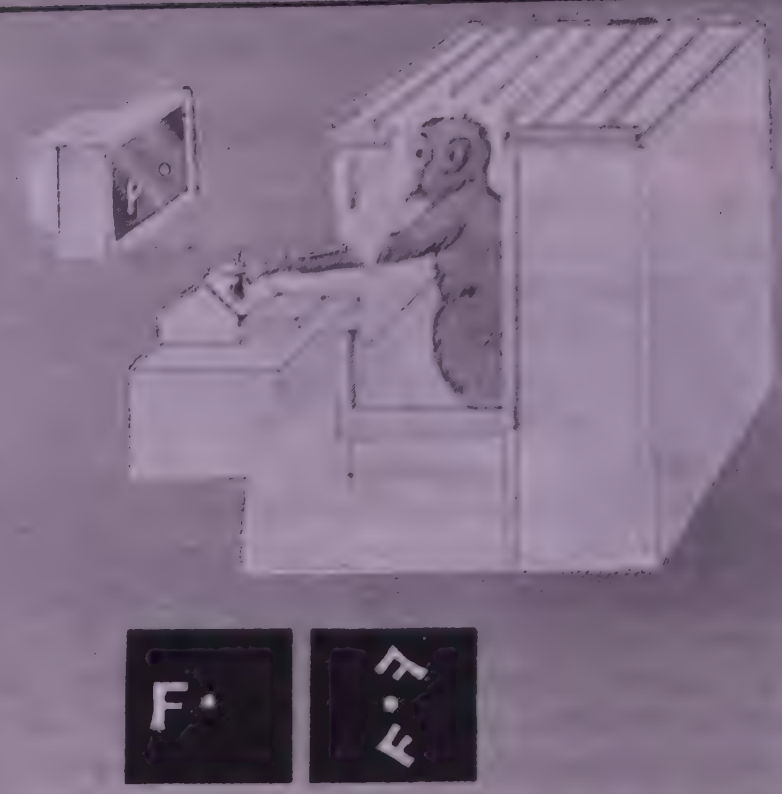
To determine whether animals and humans possess similar cognitive abilities, researchers have devised procedures that allow direct comparisons between them. For example, a cognitive ability that has been well established in human beings—but not in nonhuman species—is the ability to perform mental rotation

FIGURE 7.4

Animal Cognition: A Sample Test Environment

The upper portion of the figure shows the apparatus used to assess the baboon's ability to rotate visual stimuli mentally. Subjects were trained to use the joystick to manipulate stimuli displayed on a fourteen-inch color monitor. The bottom portion of the figure shows an example of a sample stimulus (left) and two comparison stimuli (right).

[Source: From an article by J. Vauclair, J. Fagot, & W. D. Hopkins, in *Psychological Science*, Vol. 4 (1993). Reprinted with the permission of Cambridge University Press.]



of visual forms (Shepard & Metzler, 1971). To test mental rotation, people first view a *sample stimulus*, say the letter R. They are then shown two *comparison stimuli*—rotated versions of the same stimulus and of its mirror image. Their task is to determine which of the comparison stimuli matches the sample. To do so, participants must first mentally rotate both stimuli to a normal position. The amount of time required to select the correct stimulus usually varies directly with the amount of mental rotation required.

To test whether baboons are also capable of mentally rotating visual stimuli, Vauclair, Fagot, and Hopkins (1993) developed a procedure appropriate to the abilities of baboons (please refer to Figure 7.4). In their study, subjects (baboons) first viewed a sample shape (such as the letter F) that was flashed briefly on a screen. Then two comparison shapes that were rotated 0, 60, 120, 180, 240, or 300 degrees were presented. One of the comparison shapes always matched the sample; the other comparison shape was its mirror image. The baboons' task was to use a joystick to select the comparison shapes that matched the original samples. Each correct response produced a small food reward.

The results showed that baboons were able mentally to rotate visual stimuli, an ability that some researchers had previously believed was beyond the capacity of nonhuman species. Moreover, the baboons' performance varied directly with the degree of rotation of the comparison stimuli—a finding that closely paralleled the performance of humans on the same task.

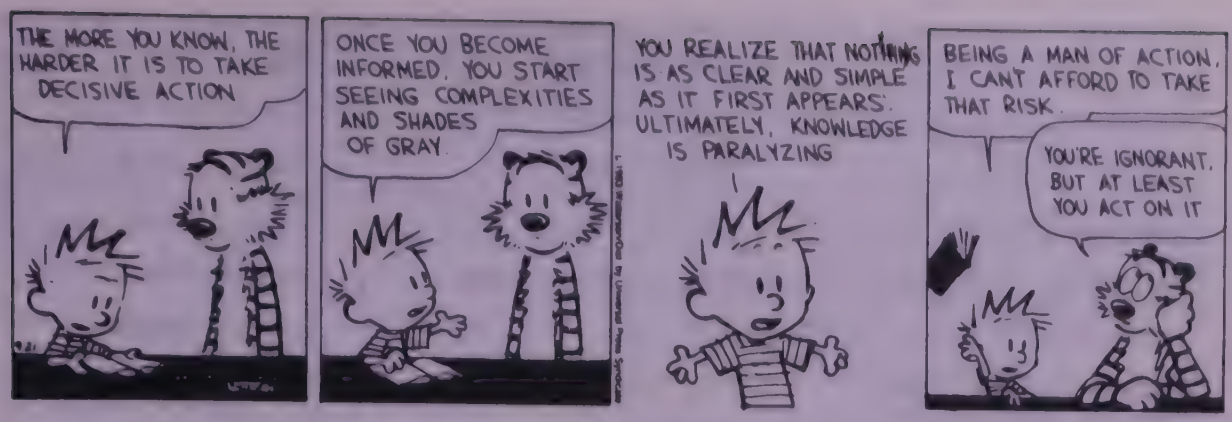
Taken together, the results of these studies, as well as others, suggest that when appropriate methods are used, other animal species show cognitive abilities that are similar in many respects to those of humans.

CRITICAL THINKING QUESTIONS

1. The results of these studies suggest that pigeons and baboons may be "smarter" than researchers initially believed possible. What follow-up research could be conducted to assess whether other species are also capable of demonstrating intelligent behaviors? Is there a particular species of animal you would choose to test this possibility?
2. In what ways can the results of the study presented in this section be used to design future studies of animal cognition? (Hint: Remember that we cannot always expect animals to do the same things humans do.)

MAKING DECISIONS: Choosing among Alternatives

Reasoning is hard work; in fact, it's an activity many people try to avoid. In some respects, though, reasoning is less difficult than another cognitive task you perform many times each day: **decision making**. From the moment you



HEURISTICS: QUICK BUT FALLIBLE DECISION TOOLS

Calvin recognizes that decision making is hard work. Like many people, Calvin may resort to heuristics—rules of thumb that reduce the amount of effort required—to help him make quicker, but not necessarily better, decisions.

(*Source:* CALVIN AND HOBBES copyright 1987 & 1993 Watterson. Dist. by UNIVERSAL PRESS SYNDICATE. Reprinted with permission. All rights reserved.)

wake up until you turn out the light at night, life presents a continuous series of choices. What to wear, what to eat for breakfast, whether to attend a class or meeting, whether to speed up so you can get through that yellow traffic light—the list of everyday decisions is endless. And at intervals we face much more important decisions: what school to attend, what job to accept, what house to buy, whether to continue or end a long-term relationship.

If you were a perfectly rational decision maker, you would make each of these choices in a cool, almost mathematical way. You would consider (1) the utility or value to you of the outcomes each alternative might yield and (2) the probability that such results would actually occur. Then, taking these two factors into account, you would make your decision on the basis of **expected utility**—the product of the value and the probability of each possible outcome. As you know from your own life, however, you don't usually pause to reason in such a systematic manner. Instead, you often make decisions informally, on the basis of hunches, intuition, or the opinions of others. And even if you did try to make decisions in a perfectly rational way, you would quickly find that even it would not provide a fail-proof method. For example, both the values you attached to various outcomes and your estimates concerning their probability might shift over time. Let's consider several factors that influence the decision-making process, making it less rational or effective than might otherwise be the case.

HEURISTICS: Using Quick—but Fallible—Rules of Thumb to Make Decisions

Where cognition is concerned, human beings definitely follow the path of least resistance whenever possible. Since making decisions is hard work, it is only reasonable to expect people to take shortcuts in performing this activity, as demonstrated by Calvin in the cartoon above. One group of cognitive shortcuts is known as **heuristics**—rules of thumb that reduce the effort required, though they may not necessarily enhance the quality or accuracy of the decisions reached (Kahneman & Tversky, 1982). Heuristics are extracted from past experience and serve as simple guidelines for making reasonably good choices quickly and efficiently. We'll focus on the three heuristics that tend to be used most frequently.

Decision Making: *The process of choosing among various courses of action or alternatives.*

Expected Utility: *The product of the subjective value of an event and its predicted probability of occurrence.*

Heuristics: *Mental rules of thumb that permit us to make decisions and judgments in a rapid and efficient manner.*

Availability Heuristic: *A cognitive rule of thumb in which the importance or probability of various events is judged on the basis of how readily they come to mind.*

AVAILABILITY: WHAT COMES TO MIND FIRST? Let's start with the **availability heuristic:** the tendency to make judgments about the frequency or likelihood of events in terms of how readily examples of them can be brought to mind. This shortcut tends to work fairly well, because the more readily we can bring events to mind, the more frequent they generally are; but it can lead us into error as well.

TABLE 7.1

The Availability Heuristic in Operation

Does this list contain more men's or women's names? The answer may surprise you: The number of male and female names is about equal. Because of the *availability heuristic*, however, most people tend to guess that female names are more numerous. Since the women listed are more famous, it is easier to bring their names to mind; this leads to overestimates of their frequency.

Louisa May Alcott	Henry Vaughan	Allan Nevins
John Dickson Carr	Kate Millet	Jane Austen
Emily Dickinson	Eudora Welty	Henry Crabb Robinson
Thomas Hughes	Richard Watson Gilder	Joseph Lincoln
Laura Ingalls Wilder	Harriet Beecher Stowe	Emily Brontë
Jack Lindsay	Pearl Buck	Arthur Hutchinson
Edward George Lytton	Amy Lowell	James Hunt
Margaret Mitchell	Robert Lovett	Erica Jong
Michael Drayton	Edna St. Vincent Millay	Brian Hooker
Edith Wharton	George Jean Nathan	

A good example of the availability heuristic in operation is provided by a study conducted by Tversky and Kahneman (1974). They presented participants with lists of names like the one in Table 7.1 and then asked whether the lists contained more men's or women's names. Although the numbers of male and female names were equal, nearly 80 percent of the participants reported that women's names appeared more frequently. Why? Because the women named in the lists were more famous, their names were more readily remembered and brought to mind.

The availability heuristic also influences many people to overestimate their chances of being a victim of a violent crime, being involved in an airplane crash, or winning the lottery. Because such events are given extensive coverage in the mass media, people can readily bring vivid examples of them to mind. The result: They conclude that such outcomes are much more frequent than they actually are (Tyler & Cook, 1984).

Representativeness: Assuming That What's Typical Is Also Likely

You have just met your next-door neighbor for the first time. On the basis of a brief conversation, you determine that he is neat in his appearance, has a good vocabulary, seems very well-read, is somewhat shy, and dresses conservatively. Later, you realize that he never mentioned what he does for a living. Is he more likely to be a business executive, a dentist, a librarian, or a waiter? One quick way of making a guess is to compare him with your idea of typical members of each of these occupations. If you proceeded in this fashion, you might conclude that he is a librarian, because his traits seem to resemble those of your image of librarians, and especially those of your ideas of the prototypical librarian, more closely than the traits of waiters, dentists, or executives. If you reasoned in this manner you would be using the **representativeness heuristic**. In other words, you would be making your decision on the basis of a relatively simple rule: The more closely an item—or event, object, or person—resembles the most typical examples of some concept or category, the more likely it is to belong to that concept or category.

Representativeness Heuristic: A mental rule of thumb suggesting that the more closely an event or object resembles typical examples of some concept or category, the more likely it is to belong to that concept or category.

While making judgments or decisions on the basis of representativeness saves cognitive effort, it can also be a source of serious errors. In particular, use of this heuristic sometimes causes us to ignore forms of information that could potentially prove very helpf l. The most important of these is information relating to *base rates*—the relative frequency of various items or events in the external world. Returning to your new neighbor, there are many more businessmen than male librarians. Thus, of the choices given, the most ratio-

nal guess might be that your neighbor is a business executive. Yet because of the representativeness heuristic, you might well decide that he is a librarian and reach a false conclusion (Tversky & Kahneman, 1974).

Anchoring-and-Adjustment: Reference Points That May Lead Us Astray The day I received my driver's license, I began to shop for my first car. After a long search, I found the car of my dreams. The major question, of course, was "How much will it cost?" A totally rational person would have located this information in the *Blue Book*, which lists the average prices paid for various used cars in recent months. But did I proceed in this fashion? Absolutely not. Given our strong tendency to follow the path of least resistance (and the fact that the *Blue Book* is not readily available everywhere), I tried a different approach. I asked the seller what he wanted for the car, then proceeded to bargain from there. At first glance, this may seem like a reasonable strategy. But think again. If you adopt it, as I did when I purchased that car, you have allowed the seller to set a *reference point*—a figure from which your negotiations will proceed. If this price is close to the one in the *Blue Book*, all well and good. If it is much higher, though, you may end up paying more for the car than it is really worth—as I did.

In such cases, decisions are influenced by what is known as the **anchoring-and-adjustment heuristic**: a mental rule of thumb for reaching decisions by making adjustments in information that is already available. The basic problem with the anchoring-and-adjustment heuristic is that the adjustments are often insufficient in magnitude to offset the impact of the original reference point. In this case, the reference point was the original asking price. In other contexts, it might be a performance rating assigned to an employee, a grade given to a term paper, or a suggested asking price for a new home (Northcraft & Neale, 1987). Please see the **Key Concept** feature (on page 270) for an overview of the heuristics we have discussed in this section.

Although the influence of heuristics appears to be quite strong, growing evidence indicates that it is often reduced in the case of experts working on tasks with which they are very familiar (Frederick & Libby, 1986; Smith & Kida, 1991). So, while the impact of such potential sources of error is strong, it is not irresistible; it can be reduced by expertise and experience.

Framing in Decision Making

Imagine that a rare tropical disease has entered the United States and is expected to kill 600 people. Two plans for combating the disease exist. If plan A is adopted, 200 people will be saved. If plan B is adopted, the chances are one in three that all 600 will be saved but two in three that no one will be saved. Which plan would you choose?

Now consider the same situation with the following changes. Again, there are two plans. If plan C is chosen, 400 people will definitely die; if plan D is chosen, the chances are one in three that no one will die, but two in three that all 600 will die. Which would you choose now?

If you are like most respondents to these scenarios, you probably chose plan A in the first example but plan D in the second example (Tversky & Kahneman, 1981). Why? Plan D is just another way of stating the outcomes of plan B, and plan C is just another way of stating the outcomes of plan A. Why, then, do you prefer plan A in the first example but plan D in the second? Because in the first example the emphasis is on *lives saved*, while in the second the emphasis is on *lives lost*. In other words, the two examples differ in what psychologists term **framing**—presentation of information about

Anchoring-and-Adjustment Heuristic: *A cognitive rule of thumb for decision making in which existing information is accepted as a reference point but then adjusted in light of various factors.*

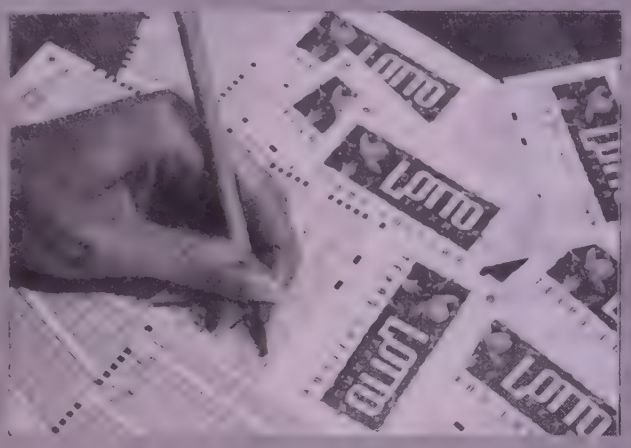
Framing: *Presentation of information concerning potential outcomes in terms of gains or losses.*

KEY CONCEPT

Factors That Influence the Decision-Making Process

Heuristics

Rules of thumb extracted from past experience that serve as guidelines for making decisions quickly and efficiently—but not infallibly.



Availability Heuristic

The tendency to make judgments about the frequency or likelihood of events in terms of how readily examples of them can be brought to mind.

Because lotto winners are given extensive media coverage, people can readily bring examples of these winners to mind. They falsely conclude that such outcomes are much more frequent than they really are.

Representativeness Heuristic

A rule of thumb suggesting that the more closely an event or object resembles typical examples of some concept or category, the more likely it is to belong to that concept or category.

Because of the representativeness heuristic, you might be tempted to label these youths as gang members.

Anchoring-and-Adjustment Heuristic

A rule of thumb in which existing information (the anchor) is accepted as a reference point but then adjusted—usually insufficiently—in light of various factors.

Familiarity with the anchoring-and-adjustment heuristic could save you a bundle—in this case, thousands of dollars when you're negotiating the price of a new home.

potential outcomes in terms of gains or in terms of losses. When the emphasis is on potential gains (lives saved), research indicates that most people are *risk averse*. They prefer avoiding unnecessary risks. Thus, most choose plan A. In contrast, when the emphasis is on potential losses (deaths), most people are *risk prone*; they prefer taking risks to accepting probable losses. As a result, most choose plan D.

Framing effects have been found to be quite general in scope. For example, negotiators tend to evaluate offers from their opponents more favorably, and to make more actual concessions, if they are urged to think about potential gains than if they are urged to think about potential losses that may result from such concessions (Neale & Bazerman, 1985).

Recent evidence suggests that the effects of framing also extend to the *amount* of information we have available to us and the *type of choice* we must make (Shafir, 1993). Imagine that you are in charge of making hiring decisions for your company. Two people have applied for a job. Both people are equally qualified, but person A's application contains more information than person B's—both positive and negative. What will you do? It depends on the type of choice you must make. If asked to *choose* one of the applicants, you will tend to focus on the amount of positive information present in each application. Because more positive information is contained on person A's application, it is likely you will choose this person. If, instead, you are asked to *reject* one of the applicants, you will tend to focus on potentially negative characteristics. On the basis of the amount of negative information available, it is likely you will reject person A, because person A's application also has more potentially negative features than person B's. In sum, the way in which information is framed can have major effects on our decisions.

Escalation of Commitment: Getting Trapped in Bad Decisions

Have you ever heard the phrase "throwing good money after bad"? It refers to the fact that in many situations, persons who have made a bad decision—one that yields negative consequences—tend to stick to it even as the evidence for its failure mounts. In fact, they may decide to commit additional time, effort, and resources to the failing course of action in order—they hope—to turn the situation around and snatch victory from the jaws of defeat. This tendency to become trapped in bad decisions is known as **escalation of commitment** and is all too common in many spheres of life. Escalation of commitment helps explain the tendencies of many investors to hold onto what are clearly bad investments, and it underlies situations in which people remain in troubled marriages or relationships long after these have begun to yield more pain than happiness (Brockner & Rubin, 1985; Staw & Ross, 1989). In these and many other cases, people do indeed seem to become trapped in bad decisions with no simple or easy means of getting out.

Escalation of Commitment: Why Does It Occur? Escalation of commitment is both real and widespread. But why, precisely, does it occur? Staw and Ross (1989) have suggested that escalation of commitment probably stems from several different factors. Early in the process, initial decisions are based primarily on what might be termed rational factors. People choose particular courses of action because they believe that these will yield favorable outcomes. When things go wrong and negative results occur, it is at first quite reasonable to continue. After all, temporary setbacks are common, and

Escalation of Commitment: *The tendency to become increasingly committed to bad decisions even as losses associated with them increase.*

it is often necessary to increase one's effort or investment in order to attain a favorable outcome (Staw & Ross, 1987). In addition, there may be considerable costs associated with changing an initial decision before it has had a chance to succeed.

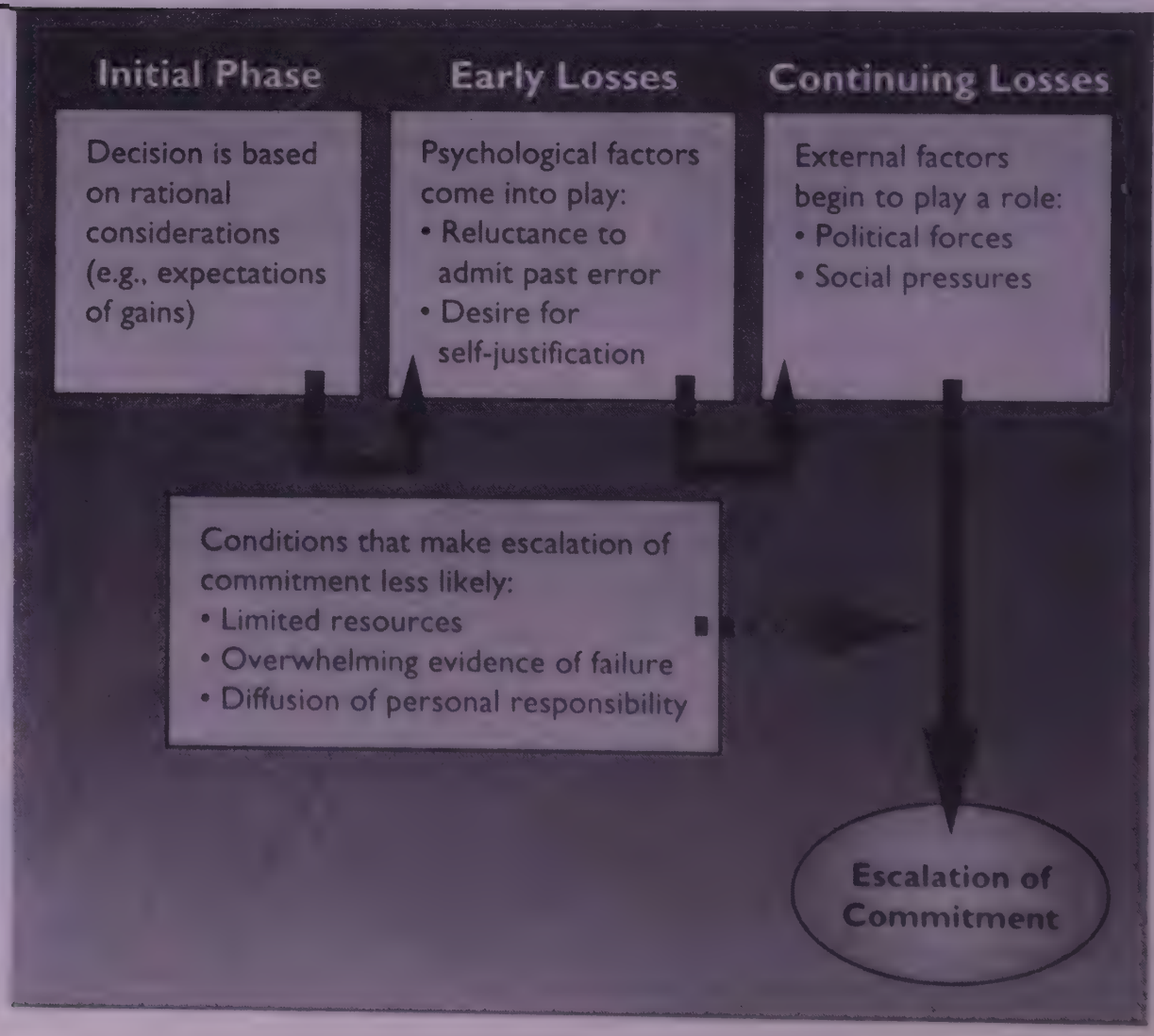
As negative outcomes continue to mount, however, other factors that can be described as primarily psychological in nature come into play. First, as indicated above, individuals feel responsible for the initial decision and realize that if they now back away from or reverse it, they will be admitting that they made a mistake. Growing evidence suggests that the unpleasant consequences of flawed decisions—including embarrassment and damage to one's self-image—can profoundly affect the quality of subsequent decisions (Larrick, 1993). Indeed, as negative results increase, individuals may experience a growing need for *self-justification*—a need to justify both their previous judgments and the losses already endured. Recent evidence indicates, in fact, that efforts to justify an earlier decision may be especially crucial to escalation of commitment: Individuals tend to stick with failing courses of action only when they have to justify these either to themselves (private self-justification) or to others (public justification) (Bobocel & Meyer, 1994).

Finally, in later phases of the process, external pressures stemming from other persons or groups affected by the bad decision may come into play. For example, individuals who did not originally make the decision but have gone along with it may now block efforts to reverse it because they too have become committed to actions it implies. Similarly, within groups, political forces may emerge that tend to lock the decision in place. Figure 7.5 summarizes the escalation process and several factors that play a role in its emergence and persistence.

FIGURE 7.5

Escalation of Commitment: An Overview

Early in the escalation process, there may be a rational expectation of a positive outcome. As losses occur, however, people are reluctant to admit their errors and seek self-justification. Later, external factors may strengthen tendencies to stick to the initial bad decision. However, other conditions may reduce the likelihood of escalation of commitment.
(*Source:* Based on suggestions by Staw & Ross, 1989, and Garland & Newport, 1991.)



Can anything be done to counter these effects? Researchers have found several conditions under which people are less likely to escalate their commitment to a failed course of action (refer to Figure 7.5). First, people are likely to refrain from escalating commitment when available resources to commit to further action are limited and evidence of failure is overwhelming (Garland & Newport, 1991). An individual or group can decide in advance that if losses reach some limit, no further resources will be squandered. Second, escalation of commitment is unlikely to occur when people can *diffuse their responsibility* for being part of a poor decision (Whyte, 1991). In other words, the less we feel personally responsible for a bad decision, the less we may be motivated to justify the mistake by investing additional time or money. Thus, a helpful strategy is to assign the tasks of decisions and implementing them to different persons. This allows those who carry out decisions to be psychologically aloof from them. Together, these steps can help both individuals and groups avoid getting trapped in costly spirals that magnify the harmful effects of poor decisions. (See chapter 16 for more information on diffusion of responsibility.)

Key Points

- We do not make all decisions on the basis of expected utility; rather, we often use heuristics, or mental rules of thumb.
- These include the availability heuristic, the representativeness heuristic, and the anchoring-and-adjustment heuristic.
- Decisions can be strongly affected by framing, the presentation of information about possible outcomes in terms of gains or losses.
- People often become trapped in bad decisions through escalation of commitment, an effect that derives from reluctance to admit past mistakes and a desire to justify past losses.

Problem Solving and Creativity: Finding Paths to Desired Goals

Imagine that you are a parent whose son is attending college in another state. You've asked him to keep in touch but long periods go by without a word—by either phone or mail. In fact, several weeks have passed since you last heard anything from him. You're something of a worrier, so you phone him repeatedly; all you get is his answering machine. What do you do? Several possibilities exist. You could call some of his friends and ask them to urge him to get in touch with you. You could try leaving a message that, you hope, will cause him to phone. Or—and here's the interesting one—you could try something like this: You write a letter to your son. In your letter, you mention that you've enclosed a check, but you don't really enclose one. Have you solved your problem? In all probability, you have. Unless your son is truly unusual, he is very likely to pick up the phone and dial your number to find out what happened to the check!

"The Card Players" by Paul Cezanne

How are problem-solving skills used during card games? The winner is the person who has successfully solved the problem set by the rules of the game (of course, luck also plays a role!).

While you may not have any children, there is little doubt that you have encountered situations that resemble this one in basic structure: You would like to reach some goal, but there is no simple or direct way of

doing so. Such situations involve **problem solving**, efforts to develop responses that permit us to attain desired goals. In this section we'll examine the nature of problem solving, techniques for enhancing its effectiveness, and factors that interfere with its successful execution. In addition, we'll analyze creativity—the ability to produce new and unusual solutions to various problems.

Problem Solving: An Overview

What does problem solving involve? Psychologists are not totally in agreement on this basic issue, but many believe that four major aspects, as summarized in Figure 7.6, are central (Matlin, 1990).

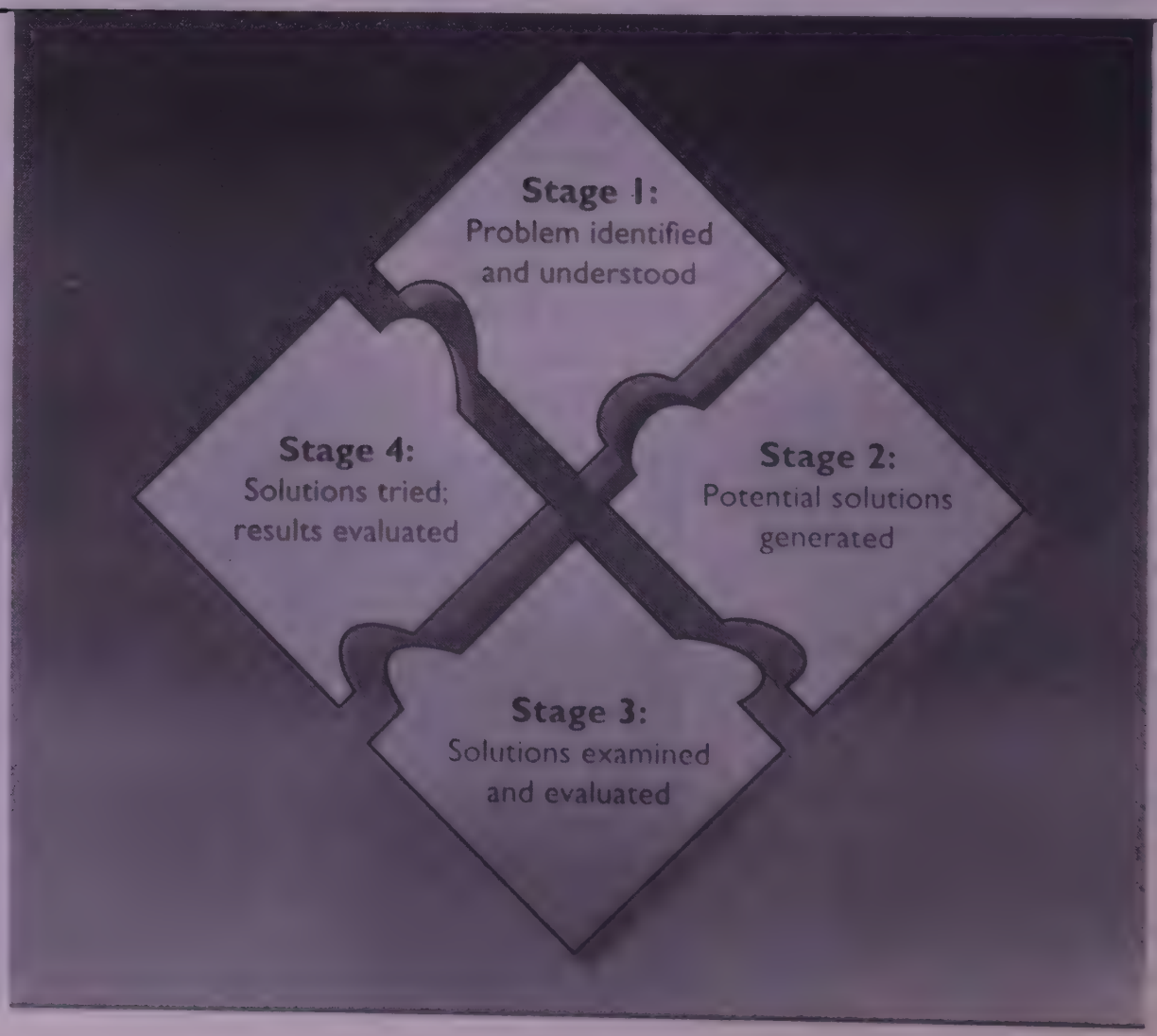
First, we must *understand* the problem—figure out just what issues, obstacles, and goals are involved. In the example above, the immediate problem boils down to this: You want to find some way of inducing your son to contact you. But identifying the problems we face is not always so simple. For example, imagine that your car won't start. Why? Is it a bad battery? Bad ignition? Lack of fuel? Until you identify the problem, it is difficult to move ahead with its solution.

Second, we must *formulate potential solutions*. While, this, too, might seem fairly simple, it is actually very complex. Solutions cannot arise out of a cognitive vacuum; they depend very heavily on the information at our disposal—information stored in long-term memory that can be retrieved (refer to chapter 6). The more information available, the greater the number and the wider the scope of potential solutions we can generate (an issue we'll consider in greater detail in the next **Point of It All** section). Formulating a wide range of possible solutions is an extremely important step in effective problem solving. Yet even when abundant information is available, several ten-

FIGURE 7.6

Problem Solving: An Overview

Effective problem solving involves four stages. First, the problem must be identified and understood. Next, potential solutions must be generated. Third, these must be examined and evaluated. Finally, solutions must be tried and then evaluated in terms of their successes.



Problem Solving: *Efforts to develop or choose among various responses in order to attain desired goals.*

dencies and potential sources of bias can cause us to overlook useful solutions and get stuck on less productive ones.

Third, we must *evaluate* each alternative and the outcomes it will produce. Will a given solution actually work—bring us closer to the goal we want? Are there any serious obstacles to its use? Are there hidden costs that will make a potential solution less useful than it seems at first? These are considerations that must be taken into account.

Finally, we must *try* potential solutions and evaluate them on the basis of the effects they produce. All too often, a potential solution is only partially effective: It brings us closer to where we want to be but doesn't solve the problem completely or finally. The tantalizing-letter strategy described above illustrates this point. Yes, it may induce a response from the erring child on this occasion. But it does not guarantee that he will write or phone more frequently in the future. So it constitutes only a partial solution to the problem. In this case it is easy to recognize that the solution is only a partial one. In many other situations, though, it is difficult to know how effective a potential solution will be until it is actually implemented. Thus, careful assessment of the effects of various solutions is another key step in the problem-solving process. We'll turn to a discussion of how educators have attempted to solve a problem of critical importance—the education crisis in America—in the **Point of It All** section that follows.

The Point of It All

The Education Crisis in America: Practice May Be the Key

You've no doubt heard about the "education crisis" in America. But what is this crisis? A growing number of cross-cultural studies suggest that American children perform poorly on tests of many areas of knowledge, notably mathematical achievement, compared to their counterparts in other parts of the world. How big are the differences? Very big. In fact, one study of math achievement among fifth graders in Japan and the United States showed that the highest-performing U.S. classroom earned a lower average score than the lowest-performing Japanese classroom (Stevenson, Lee & Stigler, 1986).

What is the reason for these differences? Since there is no evidence indicating that children in the United States are less intelligent than those in other countries, a more plausible explanation for these findings is that children in the United States lack important skills necessary to acquire mathematical knowledge (Mayer, Tajika, & Stanley, 1991). To test this possibility, Geary, Fan, & Bow-Thomas (1992) asked first graders in the United States and China to solve a series of simple arithmetic problems. Of particular interest to these researchers were the strategies the children used to solve the problems. As predicted, the Chinese children outperformed their U.S. counterparts by a three-to-one margin in terms of the overall number of problems they solved correctly. More importantly, however, were differences observed between the two groups of children in terms of the problem-solving strategies they used and the efficiency with which they used them.

Children in the United States were more likely to solve the problems by counting on their fingers or counting verbally—both somewhat inefficient problem-solving techniques. In contrast, the Chinese children relied on more advanced strategies. They retrieved most of the answers directly from memory, and when a backup strategy was needed, they decomposed the problem

into a simpler form. When the American children used these strategies to solve problems—which was infrequent—they were much less efficient in doing so.

These results suggest that children need to acquire mathematical information, as well as basic concepts, by means of practice and drill. Information, in turn, may serve as a solid foundation for acquiring more complex mathematical skills and concepts later on (Geary & Widaman, 1992).

Methods for Solving Problems: From Trial and Error to Heuristics

Suppose that you are working on your friend's computer, trying to complete a term paper due tomorrow. The pressure is mounting. You decide to take a break and then you realize—with panic—that you don't remember how to save, or put in memory, what you've written with this word processor. You think for a moment, then try hitting one of the keys, but nothing happens. You try another key; again no result. You hit a third one and the message "Find What?" appears on the screen. Now you decide to try a combination of keys. You are still trying, and still in a panic, when your friend arrives and rescues you.

This incident illustrates a problem-solving technique you have certainly used yourself—**trial and error**. Trial and error involves trying different responses until, perhaps, one works. Sometimes this is all you can do: You don't have enough information to adopt a more systematic approach. But such an approach is not very efficient, and it offers no guarantee that you'll find a useful solution.

A second general approach to solving problems involves the use of **algorithms**. These are rules for a particular kind of problem that will, if followed, yield a solution. For example, imagine that you are supposed to meet a friend at a restaurant. Try as you may, you can't remember the name of the place. What can you do? One approach is to get out the yellow pages and see if this refreshes your memory. If it doesn't, you can try calling all the restaurants listed to ask if your friend made a reservation (which you know she was planning to do). Following this algorithm—"Call every restaurant in the book"—will eventually work; but it is time-consuming and inefficient. A much more effective way of solving many problems is to use an appropriate *heuristic*.

Heuristics, as you'll recall, are rules of thumb we often use to guide our cognition. With respect to problem solving, heuristics involve strategies suggested by prior experience—ones we have found useful in the past. These may or may not work in the present case, so a solution is not guaranteed. But what heuristics lack in terms of certainty they gain in efficiency: They often provide useful shortcuts. In the case of the forgotten restaurant, you might begin by assuming that your friend probably chose a restaurant close to where she lives. This simple rule could eliminate many of the most distant restaurants and considerably simplify your task.

One heuristic we often employ is known as **means-ends analysis** (or subgoals analysis). This involves dividing the problem into a series of smaller pieces, or subproblems. Each of these is then solved, and the distance between our original state and the goal is reduced in a step-by-step fashion.

Finally, we sometimes attempt to solve problems through the use of **analogy**—by applying techniques that worked in similar situations in the past.

Trial and Error: *A method of solving problems in which possible solutions are tried until one succeeds.*

Algorithm: *A rule that guarantees a solution to a specific type of problem.*

Means-Ends Analysis: *A technique for solving problems in which the overall problem is divided into parts and efforts are made to solve each part in turn.*

Analogy: *A strategy for solving problems based on applying solutions that were previously successful with other problems similar in underlying structure.*

For example, imagine that while driving through an unfamiliar town, you are suddenly seized by an uncontrollable desire for a Big Mac. You don't know your way around this town, but you know from past experience that many McDonald's restaurants are located near busy interstate highways. Applying this knowledge, you follow signs showing the way to the nearest interstate. If you are then rewarded by the sight of the famous golden arches, you have solved the problem through analogy.

Factors That Interfere with Effective Problem Solving

Sometimes, despite our best efforts, we are unable to solve problems. In many cases our failure stems from obvious causes, such as lack of necessary information or experience. Similarly, as we'll soon see, we may lack internal frameworks that allow us to represent the problem situation fully and effectively. As a result, we don't know which variables or factors are most important, and we spend lots of time "wandering about," using an informal type of trial and error (Johnson, 1985). In other cases, though, difficulties in solving problems seem to stem from more subtle factors. Let's consider some of these now.

Functional Fixedness: Prior Use versus Present Solutions Suppose you want to use the objects shown in Figure 7.7 to attach the candle to a wall so that it can stand upright and burn properly. What solution(s) do you come up with? If you are like most people, you may mention using the tacks to nail the candle to the wall or attaching it with melted wax (Duncker, 1945). While these techniques may work, they overlook a much more elegant solution: emptying the box of matches, attaching the box to the wall, and placing the candle on it (see Figure 7.8 on page 278). Described like this, the solution probably sounds obvious. Then why don't most people think of it? The answer involves **functional fixedness**—a strong tendency to think of using objects only in ways they have been used before. Since most of us have never used an empty box as a candle holder, we don't think of it in these terms and so fail to hit on this solution. Interestingly, if the matchbox is shown empty, people are much more likely to use it as a candle holder (Weisberg & Suls, 1973); it doesn't take much to overcome such mental blind spots. But unless we can avoid functional fixedness, our ability to solve many problems can be seriously impaired.

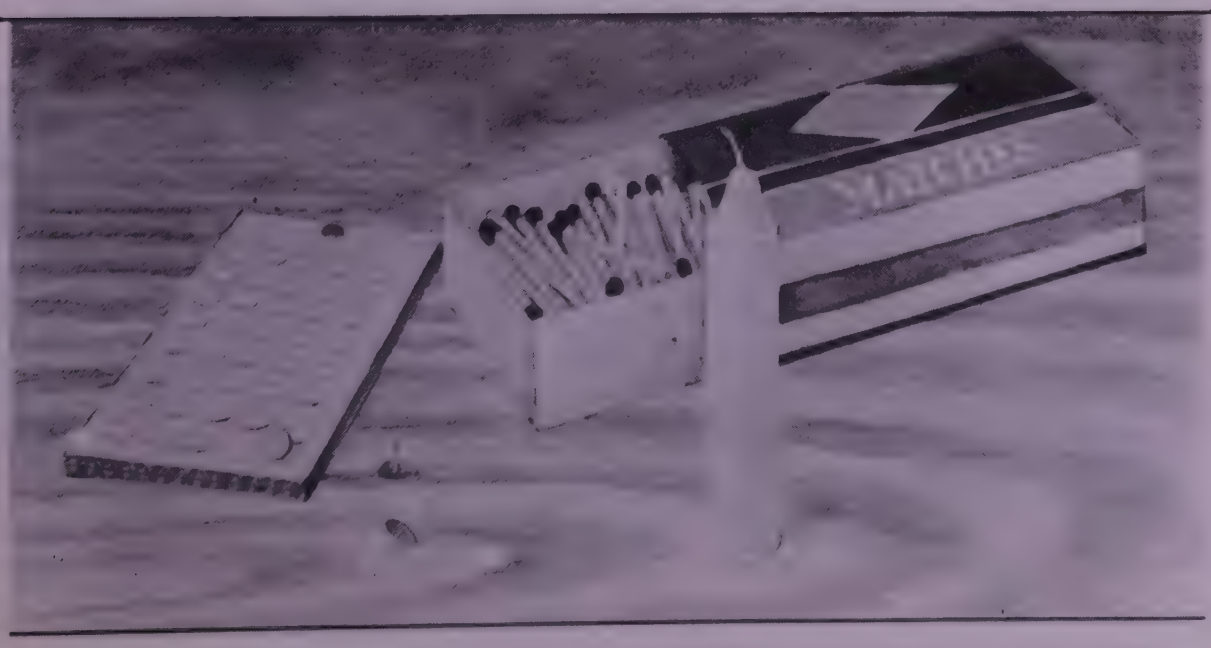


Figure 7.7

Solving Complex Problems

How can you attach the candle to a wall so that it stands upright and burns normally, using only the objects shown here?

Functional Fixedness: *The tendency to think of using objects only as they have been used in the past.*

FIGURE 7.8

Functional Fixedness: How It Interferes with Problem Solving

Because of functional fixedness, surprisingly few people think of using the tacks to attach the box to the wall as a candle holder.

MENTAL SET: STICKING TO THE TRIED AND TRUE Another factor that often gets in the way of effective problem solving is **mental set**. This is the tendency to stick with a familiar method of solving particular types of problems, one that has worked before. Since past solutions have in fact succeeded, this is certainly reasonable, at least up to a point. Difficulties arise, however, when this tendency causes us to overlook other more efficient approaches. The powerful impact of mental set was first demonstrated by Luchins (1942) in what is now a classic study. Luchins presented study participants with the problems shown in Table 7.2, which involve using three jars of different sizes to measure amounts of water. If you work through the first two or three items, you will soon discover that you can solve them all by following this simple formula: Fill jar B, and from it fill jar A once and jar C twice. The amount of water remaining is then the desired amount.

Because this formula works for all items, subjects in Luchins's study tended to stick with it for all seven problems. But look at item 6: it can be solved in a simpler way. Just fill jar A, then from it fill jar C. The amount remaining in jar A is precisely what's required (20 units). A simple solution also exists for item 7; see if you can figure it out. Do you think many of the subjects in Luchins's experiment noticed these simpler solutions? Absolutely not. When they reached item 6, almost all continued to use their old tried-and-true formula and overlooked the more efficient one.

Similar effects occur in many other contexts. For example, commuters often continue to take the same crowded roads to work each day because they have always done so; they don't even consider alternate routes that might seem less direct but are actually easier to travel. In these and many other situations, sliding into mental ruts can indeed prove costly.

KEY POINTS

- Problem solving involves efforts to develop or choose among various responses to attain desired goals.
- Problems can be solved through trial and error or through the use of algorithms—rules that will, if followed, yield solutions in given situations.
- Heuristics are rules of thumb suggested by our experience that we often use to solve problems.
- Functional fixedness—the tendency to think of using objects only as they have been used before—and mental sets—tendencies to stick with familiar methods—can interfere with effective problem solving.

TABLE 7.2

Mental Set: Another Potential Deterrent to Problem Solving

How can you use three jars, A, B, and C, each capable of holding the amounts of liquid shown, to end up with one jar holding the exact amount listed in the right-hand column? See the text for two possible solutions.

	AMOUNT HELD BY EACH JAR			
PROBLEM	JAR A	JAR B	JAR C	GOAL (AMOUNT OF WATER DESIRED)
1	24	130	3	100
2	9	44	7	21
3	21	58	4	29
4	12	160	25	98
5	19	75	5	46
6	23	49	3	20
7	18	48	4	22

CREATIVITY: *Innovative Problem Solving*

After the battle of Marengo in 1805, at which he won a great victory, Napoleon asked his chef to prepare a special celebration dinner. Unfortunately, the poor chef had very little to work with—nothing but a chicken, some onions, mushrooms, tomatoes, and wine. What could he do? Drawing on his culinary expertise, he created a new dish that has now become a classic of French cooking: Chicken Marengo.

Most people would say that the chef's solution to this problem showed **creativity**—cognitive activity that results in a new or novel way of viewing or solving a problem (Solso, 1991). Further, most people would agree that creativity is desirable; after all, it is from creativity that major inventions, scientific breakthroughs, and great works of music, literature, and art derive. While it is tempting to assume that creativity springs suddenly from flashes of inspiration or other heroic sources, psychologists who have studied it conclude that in fact the creative process consists of several specific activities that occur in a series.

- First, creativity involves considerable preparation. A person who develops a creative solution to an important problem generally spends long periods of time immersed in the problem, gathering knowledge relevant to it, and working on it. As Thomas Edison once remarked, "Success is ninety-eight percent perspiration and only two percent inspiration."
- Second, creative solutions often emerge after a period of incubation—an interval during which the person involved stops working actively on the problem and turns to other matters. Incubation periods may provide people with an opportunity to recover from the fatigue generated by the intense preparation phase. And as noted in chapter 4, during incubation additional work on the problem may be occurring even outside the realm of consciousness, such as during sleep.
- Third, creativity does often involve a sudden illumination, or insight. At such times, individuals report that they suddenly see, perhaps only in partially developed form, the first glimmer of a solution they have been seeking for months or even years. This is how James Watson and Francis Crick, the scientists who discovered the structure of the DNA molecule, describe the experience; suddenly, they saw that it must be something like a double helix, with one strand intertwined with the other.
- Illumination, however, is not the end of the process. Considerable refinement must often follow. The idea must be worked out, translated into testable form, then actually tested. Only when mounting evidence indicates that it does work is the creative solution carried to its final conclusion.

Describing the creative process is certainly useful, but it does not address several key questions: What cognitive processes does creativity involve? Can these be encouraged? And how can creativity be assessed?

With respect to the first of these issues, research findings suggest that creativity often derives from **divergent thinking**. This is thinking that moves outward from conventional knowledge or wisdom into unexplored paths and unconventional solutions. It is from such thinking that creative breakthroughs seem to derive. In contrast, **convergent thinking** applies existing knowledge and rules of logic to the task of narrowing the range of potential solutions and zeroing in on a single correct answer. While such thinking is productive in many situations, it does not appear to foster true creativity.

Mental Set: *The impact of past experience on present problem solving; specifically, the tendency to retain methods that were successful in the past even if better alternatives now exist.*

Creativity: *Cognitive activity resulting in new or novel ways of viewing or solving problems.*

Divergent Thinking: *Thinking that moves outside conventional solutions or knowledge in an effort to develop novel solutions to a problem.*

Convergent Thinking: *Thinking that applies existing knowledge and rules of logic so as to zero in on a single correct solution to a problem.*

Second, perhaps even more important from a practical point of view, what can individuals and societies do to foster creativity? Decades of research on this question point to the following steps (Isen & Baron, 1991; Schank, 1988):

1. *Develop a broad and rich knowledge base.* Creative solutions do not emerge out of thin air. Rather, they stem from the integration and combination of knowledge that is at the disposal of problem solvers. There seems to be no substitute for the hard work of the preparation stage described above.

2. *Foster independence.* Creative people are willing to take risks and strike out on their own. If we wish to encourage creativity, it is important that society tolerate such independence and perhaps even seek to encourage its development. Some degree of conformity is necessary for most societies. But if pressures to go along with the crowd are too strong, creativity may suffer.

3. *Encourage the use of analogies.* Many creative breakthroughs seem to involve the use of analogies—recognition of similarities between a new problem and an old one or between a new potential solution and one that has worked before. Fortunately, this is a skill most people can develop if given the opportunity to do so. Thus, making the use of analogies part of school curricula may be a helpful step toward fostering creativity.

4. *Encourage curiosity.* Creative people, it turns out, often have a high level of curiosity. They are interested in many different topics, they read widely, and they actively seek new experiences. These characteristics help expand and enrich their knowledge base—one of the key ingredients in creativity.

5. *Enhance positive affect.* The last technique for encouraging creativity is in some ways the most unexpected, but it is based on a growing body of empirical research (Isen, 1987). Several studies concerned with the influence of *affect*, or mood, on cognition indicate that when people are in a positive mood, they are often more creative than when they are in a neutral or negative mood. In one study, for example, Isen, Daubman, and Nowicki (1987) asked participants to perform the candle task described earlier. Some participants had been put in a positive mood by viewing a funny comedy film; others have viewed a film that was not expected to influence their current moods in any manner—it was about basic issues in statistics. Results indicated that 67 percent of those in a good mood correctly solved the problem, but only about 20 percent of those in a neutral mood did. Other findings in this and related investigations suggest that people in a good mood think more expansively and tend to see relations between diverse stimuli more readily than those in a neutral or negative mood. Given such effects, it is not at all surprising that a good mood can enhance creativity.

Measuring Creativity Finally, how can creativity be measured or assessed? Panels of judges often attempt to assess creativity in everything from designs for buildings to poetry, high fashion, and even doctoral dissertations; yet there is no single agreed-upon psychological test for measuring creativity. One approach, developed by Guilford (1967), is based on the distinction between convergent and divergent thinking described above. In the divergence production test, people are asked to list the number of uses they can generate for common objects—for example, bricks. The more uses a person can list, and the more unusual these are, the higher the score. Thus, responses like "build a wall" or "make a chimney" are scored as being lower in creativity than ones like "grind them up to make emergency face powder" or "give them to people going to work on Mars to use as shoes." The very strangeness of the unusual answers reflects thinking that breaks out of the ordinary cognitive channels most of us follow most of the time.

Artificial Intelligence: Can Machines Really Think?

When I took my first course in computer science, in 1964, the professor painted a glowing picture of the future capabilities of computers. The prediction that sticks most vividly in my mind, though, is his promise that within ten years we would be able to talk directly to computers in everyday English. I'm still waiting for this to happen. Outside of "Star Trek" episodes, I've yet to see someone sit down and converse readily and easily with a computer. Yet I'm optimistic that this *will* happen, and soon. The pace of progress in the computer industry is dazzling, and recent advances have moved us much closer to the goal of oral communication with computers.

If we can someday soon hold ordinary conversations with computers, and if they can do many others things we usually attribute to human intelligence, an interesting question arises: Does it make sense to say that computers are intelligent? This question lies at the heart of **artificial intelligence**—an interdisciplinary branch of science in which psychologists and other scientists study the capacity of computers to demonstrate performance that, if it were produced by human beings, would be described as showing intelligence. (We will examine the nature of intelligence in more detail in chapter 11.)

How much intelligence do computers actually show? Actually, quite a lot. Modern computers carry out complex computations at blinding speeds, often performing millions of computations per second—a capability far beyond that of mere mortals. It is therefore not surprising that computers are more proficient than people at doing repetitive tasks requiring speed and accuracy. For example, with the help of various scanning devices, computers have been trained to perform important perceptual tasks, such as detecting flaws in many different products (Robotics Institute, 1984). Since computers are tireless and can make accurate judgments with amazing speed, they are better suited for such tasks than human beings.

Computers can also be efficient problem solvers. For instance, computers have been programmed to play chess very well—almost as well as the very best human players. As you might guess, they do this primarily by relying on their great speed. Even ten years ago, chess-playing computers could scan 100,000 possible moves per second (Elmer-Dewitt, 1985); and now, of course, they are considerably faster. Thus, each time an opponent makes a move, the computer can rapidly consider all possible counters plus their likely effects. And new programs allow computers to play chess the way expert human beings do—on the basis of long-range strategies that take account of an opponent's style and apparent weaknesses.

However, as I noted earlier, efforts to demonstrate computer intelligence with regard to language have been somewhat mixed. This has caused artificial intelligence researchers—and professors like the one I had in my first course in computer science—to revise their initial predictions that development of speaking computers was "just around the corner." On one hand, the language abilities demonstrated by computers are remarkable. For example, banks, credit unions, and credit card companies now use computerized voice recognition systems regularly to handle certain business transactions, such as customer calls to check account balances. Even more impressive are computers that can converse with their owners and carry out a variety of tasks, including booking airline reservations. These complex machines possess large vocabularies, understand syntax well enough to allow them to understand normal conversation, and know when to ask relevant questions if they do not understand or do not have enough information to act (Rensberger, 1993). On the other hand, though, it has proven frustratingly difficult to teach computers to grasp many of the subtleties

Artificial Intelligence: Putting Computers to Work

The field of artificial intelligence (AI) has made rapid progress in creating computers and other "intelligent" devices capable of performing a wide variety of tasks. But are such machines truly intelligent?

Artificial Intelligence: *A branch of science that studies the capacity of computers to demonstrate performance that, if it were produced by human beings, would be described as showing intelligence.*

Key Points

- Creativity seems to involve several distinct aspects: careful preparation; incubation, or time away from the problem; flashes of illumination; and refinement of proposed solutions through testing.
- Creative breakthroughs seem to stem from divergent thinking—thinking that moves away from conventional knowledge or wisdom.
- Creativity can be encouraged by development of a rich knowledge base, independence, curiosity, and the use of analogies. It can also be increased by positive affect.
- Artificial intelligence is an interdisciplinary field concerned with the capacity of computers to demonstrate intelligent performance.
- Modern computer systems incorporate neural networks—structures consisting of millions of highly interconnected computational units working together in parallel, in imitation of certain features of the human brain.

of human speech. And many ordinary tasks that most people take for granted, such as shopping at the mall or understanding simple conversations, exceed the capabilities of even the most powerful modern computers.

In response to these and related issues, researchers have designed computers that imitate the way in which the brain—perhaps the most powerful computer in the universe—operates. Whereas most computers process information in a sequential fashion, the brain processes the input from all of our senses simultaneously through a complex network of highly connected neurons. The new computer systems, called **neural networks**, are structures consisting of highly interconnected elementary computational units that work together in parallel (Denning, 1992; Levine, 1991). The primary advantage of neural networks comes not from the individual units themselves but from the overall pattern resulting from millions of these units working together. In addition, neural networks have the capacity to learn from experience by adjusting the strength of the output from individual units based on new information. Although research on neural networks is still in its infancy, scientists have learned a great deal from these structures regarding how the brain operates.

Where does all this leave us with respect to artificial intelligence? Most psychologists who specialize in this field would readily admit that early predictions about the capacities of computers to show such characteristics as intention, understanding, and consciousness were greatly overstated (Levine, 1991; Searle, 1980). However, they note that computers are indeed exceptionally useful in the study of human cognition and can, in certain contexts, demonstrate performance that closely resembles that of intelligent human beings. You may not soon meet a robot who can speak with you in a fluent manner like the ones in films, but the chances are good that computers and other machines will continue to become more "intelligent" with the passage of time.

LANGUAGE: The Communication of Information

At present most scientists agree that what truly sets us apart from other species of animals is our use of **language**—our ability to use an extremely rich set of symbols, plus rules for combining them, to communicate information. While the members of all species do communicate with one another in some manner, and while some may use certain features of language, the human ability to do so far exceeds that of any other organism on earth. In this final section we'll examine the nature of language and its relationship to other aspects of cognition.

Neural Networks: *Computer systems modeled after the brain and made up of highly interconnected elementary computational units that work together in parallel.*

Language: *A system of symbols, plus rules for combining them, used to communicate information.*

LANGUAGE: Its Basic Nature

Language uses symbols for communicating information. For a set of symbols to be viewed as a language, however, several other criteria must be met.

First, information must actually be transmitted by the symbols: The words and sentences must carry *meaning*. Second, although the number of separate sounds or words in a language may be limited, it must be possible to combine these elements into an essentially infinite number of sentences. Finally, the meanings of these combinations must be independent of the settings in which they are used. In other words, sentences must be able to convey information about other places and other times. Only if all three of these criteria are met can the term *language* be applied to a system of communication. In actual use, language involves two major components: the *production* of speech, and its *comprehension*.

The Production of Speech All spoken language consists of **phonemes**, a set of basic sounds; **morphemes**, the smallest units of speech that convey meaning; and **syntax**, rules about how these units can be combined into sentences.

English has forty-six separate phonemes: vowels, *a*, *e*, *i*, *o*, and *u*; consonants, such as *p*, *m*, *k*, and *d*; and blends of the two. Other languages have more or fewer basic sounds. Further, different languages often employ different groups of phonemes; sounds used in one may be absent in another.

English has about 100,000 morphemes. Some of these are words; others, such as the plural *s* or prefixes such as *un* or *sub*, are not. The number of English words is greater still—about 500,000. And the number of combinations of these words, or sentences, is for all practical purposes infinite.

Speech Comprehension Have you ever listened to a conversation between two people speaking a foreign language you didn't know? If so, you may recall that it seemed very confusing. In part, this confusion results from the fact that when you listen to a language you don't speak, you can't recognize the boundaries between words.

Even in our own language, not all speech is equally easy to interpret. For example, sentences containing *negatives* (*not*, *no*) are more difficult to understand than sentences without them (Clark & Chase, 1972). Also, ambiguous sentences—those with two or more possible meanings—are harder to understand than unambiguous sentences (Mistler-Lachman, 1975). Compare "Last night I saw an alligator in my pajamas" with "Last night I saw an alligator while wearing my pajamas." Clearly, the first is harder to understand than the second. Incidentally, such ambiguity is far from rare; newspaper headlines often show this characteristic. Does "Homeless Appeal to Mayor" mean that homeless people are making an appeal to the mayor for help or that the mayor finds homeless people personally attractive? The first possibility is much more likely, but from the structure of the sentence, it's really not possible to tell.

Surface Structure and Deep Structure Suppose that I introduce you to my friend Stuart and say, "Meet Stuart; he's my oldest friend." Do I mean that he is the oldest person with whom I am friends, or that I have been friends with him longer than with anyone else? In all probability, you can tell from the context. If Stuart is about my age (which he is), you might conclude—correctly—that I've been friends with him longer than anyone else. (In fact, we've been friends since we were seven years old.) If, however, Stuart is much older than I am, you might conclude that the first meaning applies: He's the oldest person I call "friend."

This simple example illustrates one aspect of the difference between what linguists such as Noam Chomsky (1968) describe as **surface structure** and **deep structure** of language. Surface structure refers to the actual words people use and what's readily apparent about them, whereas deep structure refers to the information that underlies a sentence and gives it meaning.

Phonemes: *A set of sounds basic to a given language.*

Morphemes: *The smallest units of speech that convey meaning.*

Syntax: *Rules about how units of speech can be combined into sentences in a given language.*

Surface Structure: *The actual words of which sentences consist.*

Deep Structure: *Information that underlies the form of a sentence and is crucial to its meaning.*

Another way of seeing this distinction is by considering sentences that are grammatically correct but totally devoid of meaning. For example, consider the sentence "Dark purple ideas eat angrily." It is perfectly correct in terms of grammar but has no meaning whatsoever. In view of such facts, Chomsky and others have argued that we can never understand the true nature of spoken language by focusing only on words and grammatical rules. Rather, we must search for underlying meaning and the ways in which people translate, or transform, this into overt speech. While some psychologists question the validity of the distinction between surface and deep structure, most agree that it is useful to look beyond verbal behavior and rules of grammar in order to examine the cognitive representations on which speech is based. In this sense, the distinction Chomsky proposed has proven useful.

The Development of Language

Throughout the first weeks of life, infants have only one major means of verbal communication: crying. Within a few short years, however, children progress rapidly to speaking whole sentences and acquire a vocabulary of hundreds or even thousands of words. Some of the milestones along this remarkable journey are summarized in Table 7.3. Although we'll consider other developmental issues in more detail in chapter 8, this section will focus on two questions relating to the development of language: What mechanisms play a role in this process? And how, and at what ages, do children acquire various aspects of language skills?

Theories of Language Development: Some Contrasting Views The *social learning view* suggests one mechanism for the rapid acquisition of language. This view proposes that speech is acquired through a combination of operant conditioning and imitation. Presumably, children are praised or otherwise rewarded by their parents for making sounds approximating those of their native language. Moreover, parents often model sounds, words, or sentences for them. Together, this view contends, these basic forms of learning contribute to the rapid acquisition of language.

A sharply different view has been proposed by linguist Noam Chomsky (1968): the *innate mechanism view*. According to Chomsky, language acquisition is at least partly innate. Human beings, he contends, have a built-in neural system that provides them with an intuitive grasp of grammar—a language acquisition device. In other words, humans are prepared to acquire language and do so rapidly for this reason.

Finally, a *cognitive theory* offered by Slobin (1979) recognizes the importance of both innate mechanisms and learning. This theory suggests that children possess certain information-processing abilities or strategies that they use in acquiring language. These are termed *operating principles* and seem to be present, or to develop, very early in life. One such operating principle seems to be "Pay attention to the ends of words"—children pay more attention to the ends than to the beginnings or middles of words. This makes sense, since in many languages suffixes carry important meanings. Another principle is "Pay attention to the order of words." And indeed, word order in children's speech tends to reflect that of their parents. Since word order differs greatly from one language to another, this, too, is an important principle.

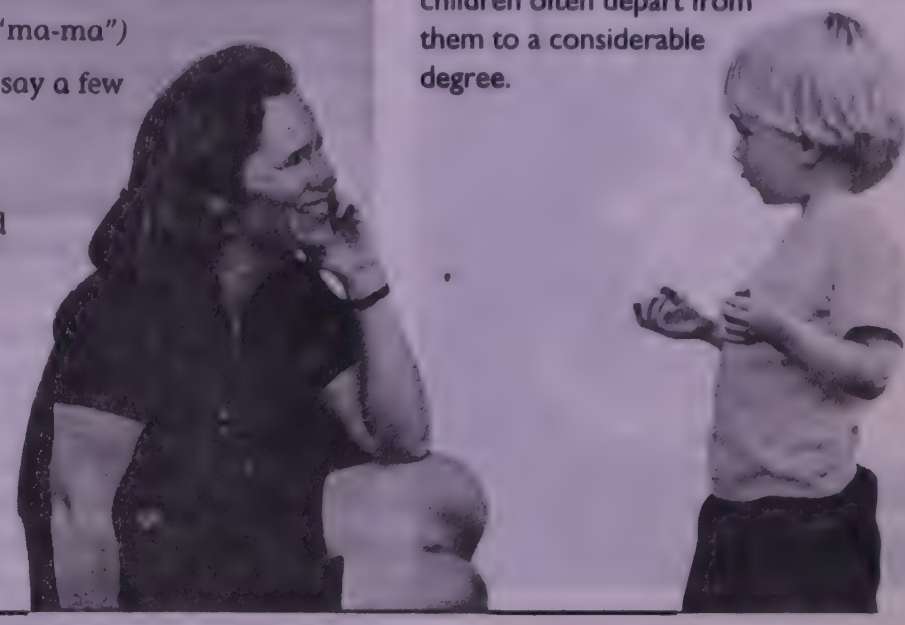
Which of these theories is correct? At present, all are supported by some evidence, but none seems sufficient by itself to account for all aspects of language development. For example, contrary to what the social learning view suggests, it appears that parents do not directly praise or reward their chil-

Average age	Language Behavior Demonstrated by Child
12 weeks	Smiles when talked to; makes cooing sounds
16 weeks	Turns head in response to human voice
20 weeks	Makes vowel and consonant sounds while cooing
6 months	Progresses from cooing to babbling that contains all sounds of human speech
8 months	Repeats certain syllables (e.g., "ma-ma")
12 months	Understands some words: may say a few
18 months	Can produce up to fifty words
24 months	Has vocabulary of more than fifty words; uses some two-word phrases
30 months	Has vocabulary of several hundred words; uses phrases of three to five words
36 months	Has vocabulary of about a thousand words
48 months	Has mastered most basic elements of language

Table 7.3

Language Development: Some Milestones

Children develop language skills at an amazing pace. These approximate ages are only *averages*; individual children often depart from them to a considerable degree.



dren for correct syntax or grammar often enough to shape such skills through conditioning (Hirsch-Pasek, Treiman, & Schneiderman, 1984). Yet in every culture children's speech resembles that of their parents in many important ways, so learning does seem to play an important role.

Turning to the possibility of an innate language acquisition device, some findings suggest that there may be a *critical period* for language development during which children find it easiest to acquire various language components (Elliott, 1981). If for some reason children are not exposed to normal speech at this time, they may find it increasingly difficult to master language (De Villiers & De Villiers, 1978).

Given this mixed pattern of evidence, it is probably safest to conclude that language development is the result of a complex process involving several aspects of learning, many cognitive processes, and perhaps various genetically determined mechanisms as well. Additional evidence is clearly needed before more precise conclusions about mechanisms of language development can be reached.

Basic Components of Language Development Although the underlying mechanisms of language development remain to be clarified, much is known about how this process unfolds. Basically, it includes progress in three distinct but interrelated areas: **phonological development**—development of the ability to pronounce the sounds and words of one or more languages; **semantic development**—learning to understand the meaning of words; and **grammar**—understanding the rules by which words are arranged into sentences in a given language.

Phonological development: The spoken word. At some point between three and six months, babies begin babbling. At first **babbling** contains a rich mixture of sounds, virtually every sound used in human speech. By nine or

Phonological Development: *Development of the ability to produce recognizable speech.*

Semantic Development: *Development of understanding of the meaning of spoken or written language.*

Grammar: *Rules within a given language indicating how words can be combined into meaningful sentences.*

Babbling: *An early stage of speech development in which infants emit virtually all known sounds of human speech.*

A First Step toward Language Development

Most children say their first spoken words by their first birthday. After this milestone, their vocabulary grows rapidly.

ten months, however, the range of babbling narrows and consists mainly of sounds used in the language of the child's native culture. From this point to the production of the first spoken word is a relatively short step, and most children accomplish it by their first birthday.

After the appearance of the first word, a child's vocabulary grows rapidly. However, many children apply **phonological strategies**, techniques for simplifying the pronunciation of many words; for example, they may delete unstressed syllables so that *banana* becomes *nana* or a name like *Melissa* becomes *Lissy*. Pronunciation improves rapidly during the preschool years, but some refinements continue throughout childhood; for example, learning to change the stressed syllable when words add endings (*prac*tical to practic*al*ity, *hu*mid to hu*mid*ity).

Semantic development: The acquisition of meaning. By age six, most children have a vocabulary of more than 14,000 words. This means they add an average of about nine new words to their vocabulary each day—in part by asking their parents to name everything in sight (Clark, 1973). Some researchers suggest that children accomplish this feat through a process called **fast mapping**: They "map" a new word to an underlying concept as a result of a single exposure. This is fast indeed; consider how many times you, as an adult, must encounter a word in a foreign language before you can enter it into your vocabulary.

The first words acquired by children are *object words*, which apply to specific objects in the world. These are followed by *action words*, which describe specific activities. Children's use of specific words does not always conform to adults' usage, however. Initially, they may use a noun such as *door* and a verb such as *open* to refer to the same action: opening the door. It is not until they are two to two and a half that most children begin to use *state words*, ones describing transient conditions such as *dirty*, *clean*, *hot*, or *cold*.

As children increase their vocabulary, they often demonstrate several interesting forms of error. First, they show *mismatches*, instances in which a new word is attached to an inappropriate concept. For example, they may relate the word *old* to something they want and *new* to something they dislike, as in "I want *old* candy, not *new* candy." In addition, they often show *underextensions*, in which a term is applied to a smaller range of objects or events than its true meaning calls for, or *overextensions*, in which a term is applied to a wider range than appropriate. An underextension might be use of the word *apple* to refer only to red apples; overextension might be application of the word *car* to any and all vehicles. Finally, children often coin new words; they may refer to a hammer as "hitter," for instance.

Grammatical development. Every language has *grammar*, a set of rules dictating how words can be combined into sentences. Children must learn to follow these rules, as well as to utter sounds that others can recognize as words. At first grammar poses little problem, since early speech is *holophrastic*—that is, young children use single words to express complex meanings. Thus, "Eat!" may mean "I want to eat" or "Mommy is eating." By the time most children are two, they progress to *telegraphic* speech, omitting less-important words. An example: "Daddy cookie" may mean "Give Daddy a cookie" or "Daddy, bring me some cookies."

Between two and three, most children begin to use simple sentences consisting of three words. *Mean utterance length*, the average length of the sentences children use (Brown, 1973), increases to about three or four words between the ages of three and six; and more complex grammatical forms also appear, including use of conjunctions such as *and* and connected clauses—

Phonological Strategies: *Simplifications used by young children to facilitate the task of producing recognizable speech.*

Fast Mapping: *A process through which children attach a new word to an underlying concept on the basis of a single encounter with it.*

"Dad picked me up at school and we went for hamburgers." The use of increasingly complex forms in everyday speech continues to develop throughout childhood and is not complete until early adolescence.

In sum, language development is definitely a continuing feature of cognitive development throughout childhood. Given the complexity it involves, and its central role in many aspects of cognition, this is far from surprising.

KEY POINTS

- Language involves the ability to use a rich set of symbols, plus rules for combining these, to communicate information. It includes the abilities to produce and to comprehend speech.
- Language seems to involve more than mere spoken words and rules of grammar, or surface structure. The underlying meaning, or deep structure, is important, too.
- Contrasting theories of language development suggest that language is acquired by children through social learning, innate mechanisms, and cognitive mechanisms.
- Language acquisition involves phonological development, semantic development, and acquisition of grammar.

LANGUAGE AND THOUGHT: *Do We Think What We Say or Say What We Think?*

Although we often have vivid mental images, most of our thinking seems to involve words. This fact raises an intriguing question: What is the precise relationship between language and thought? One possibility, known as the **linguistic relativity hypothesis**, suggests that language actually shapes or determines thought (Whorf, 1956). According to this view, people who speak different languages may actually perceive the world in different ways because their thinking is determined, at least in part, by the words available to them. For example, Eskimos, who have many different words to describe snow, may actually perceive this aspect of the physical world differently from English-speaking people who have only one word.

The opposing view is that thought shapes language. This position suggests that language merely reflects the way we think—how our minds work. Which position is more accurate? While the issue is far from resolved, existing evidence seems to argue against the linguistic relativity approach (Miura & Okamoto, 1989). If this approach were correct, people who speak a language that has few words to describe colors should have greater difficulty in perceiving various colors than people who speak a language rich in color words. But research designed to test such possibilities has generally failed to support them. In one experiment, Rosch (1973) studied natives of New Guinea. Their language, Dani, has only two color names: *mola*, for bright, warm colors, and *mili*, for dark, cool ones. Rosch found that despite this fact, Dani speakers perceived colors in much the same manner as persons who speak English, a language containing many color words.

So, while it may indeed be easier to express a particular idea or concept in one language than another, this in no way implies that our thoughts or perceptions are strongly shaped by language. On the contrary, basic aspects of human perception and thought seem to be very much the same around the world, regardless of spoken language.

LANGUAGE IN OTHER SPECIES

Members of nonhuman species communicate with one another in many ways. Bees do a complex dance to indicate the distance to and direction of a food source; birds sing songs when seeking to attract a mate; seagoing mammals in the wild, such as whales, communicate with one another through complex patterns of sounds. But what about language? Are we the only species capable of using this sophisticated means of communication? Until the 1970s there seemed little question that this was so. Early efforts to teach

Linguistic Relativity Hypothesis: *The view that language shapes thought.*

chimpanzees to speak failed miserably. For example, during the 1940s Keith and Cathy Hayes raised a chimp named Vicki from infancy in their home and provided her with intensive speech training; but she was able to utter only a few simple words such as "mama," "papa," and "cup."

These disappointing results were due in part to the fact that nonhuman primates (and other animals) lack the vocal control necessary to form words, and hence *spoken* language. But as we saw earlier in our discussion of animal cognition, it is not always appropriate to ask animals to do what people do. The ability to speak is not essential for the use of language. For example, persons who have lost the power of speech through accident or illness can still communicate by writing or sign language. The fact that chimps cannot learn to speak, then, does not rule out the possibility that they or other animals can learn to use some form of language.

The findings reported by several teams of researchers seem to indicate that this may be so. Beatrice and Allen Gardner succeeded in teaching Washoe, a female chimp, to use and understand almost 200 words in American Sign Language (ASL), which is used by many deaf persons (Gardner & Gardner, 1975). After several years of practice, Washoe could respond to simple questions and request actions such as tickling and objects such as food. She even learned to describe her mood with signs for "hurt," "sorry," and "funny."

Research with gorillas, too, has yielded what some interpret as evidence for the ability to use language. Francine Patterson (1978) taught Koko, a female gorilla, a vocabulary of several hundred signs. Patterson reported that Koko showed great flexibility in using signs, constructing original sentences, remembering and describing past events, and even creating her own signs for new objects and events. Thus, she termed zebras "white tigers." Interestingly, Koko learned to use language in complex and all-too-human ways, such as bending the truth to her own advantage. In one incident she jumped on a sink and pulled it out from the wall. When asked if she had caused this damage, she accused one of the researchers of being responsible.

In what may be the most surprising evidence of all, Irene Pepperberg has trained an African gray parrot named Alex to use speech in what appear to be highly complex ways (Stipp, 1990). Alex can name more than eighty objects and events, frequently requests things he wants ("I want shower"), and has been known to give directions to his human trainers. But does Alex really understand the words he uses? Professor Pepperberg believes that he does. On one occasion Alex was given an apple for the first time. He immediately labeled it "banerry," and he stuck with this word despite her best efforts to teach him "apple." Her explanation: apples taste somewhat like bananas and look something like cherries, so Alex had chosen a word that from his perspective was quite appropriate.

ALEX: THE AFRICAN GRAY PARROT

Irene Pepperberg has trained an African gray parrot to use speech in apparently complex ways. But does Alex really understand the words he uses?

ARE WE THE ONLY SPECIES CAPABLE OF USING LANGUAGE? SOME RECENT FINDINGS Based on the evidence presented thus far, you may now be ready to conclude that members of these species can indeed use language. Please note, however, that this conclusion has been the source of great controversy. Many psychologists believe that the animals in these studies, while exhibiting impressive learning, are not really demonstrating use of language (Davidson & Hopson, 1988; Terrace, 1985). For instance, close examination of the procedures used to train and test the animals suggests that their trainers may often unintentionally provide subtle cues that help animals respond correctly to questions. It also appears that in some cases trainers may have overinterpreted the animals' responses, reading complex meanings and intentions into relatively simple signs. Finally, it is still unclear whether animals are capable of mastering several basic features of human languages; for example,

syntax—the rules by which words are arranged to form meaningful sentences—and *generativity*—the ability to combine a relatively limited number of words into unique combinations that convey a broad range of meaning.

Recent studies involving other species of animals, including bonobos (a rare type of chimpanzee) and dolphins, have begun to address these and related issues. For example, consider the language abilities demonstrated by a twelve-year-old bonobo named Kanzi (Linden, 1993). Psychologist Sue Savage-Rumbaugh first began studying bonobos in the 1980s. While attempting to teach Kanzi's mother to use an artificial language made up of abstract visual symbols, she noticed that Kanzi (then an infant) learned several symbols just by watching. Intrigued by the possibilities raised by this discovery, Savage-Rumbaugh and her colleagues continued to train Kanzi in this informal way—speaking to him throughout the day, while simultaneously pointing to the corresponding symbols on portable language boards they carried with them. Kanzi quickly learned to combine the symbol-words to request snacks and preferred activities, such as watching Tarzan movies.

Since then, Kanzi has demonstrated a grasp of grammatical concepts, and he now comprehends several hundred spoken words. In one experiment, Savage-Rumbaugh and her colleagues compared Kanzi and a two-year-old girl in terms of their ability to respond to commands expressed in spoken sentences (Savage-Rumbaugh et al., 1992). The sentences consisted of familiar words that were combined to produce commands that Kanzi and the little girl had never heard before. Surprisingly, Kanzi's progress in comprehending the novel commands paralleled the little girl's throughout most of the experiment, although her language abilities eventually surpassed Kanzi's (his ability topped out at the level of an average 2½-year-old child). More importantly, though, the use of strict control procedures ruled out the possibility that Kanzi was responding to subtle cues from his trainers, a criticism leveled against many early demonstrations of animal language. For instance, a one-way mirror prevented Kanzi from seeing who gave him the commands, and persons recording his responses wore headphones to prevent them from hearing the requests. Psychologists are now more willing to accept that Kanzi was responding solely to the requests.

But are animals capable of grasping more complex features of language? Psychologist Louis Herman believes the answer is yes. Herman and his colleagues taught a female dolphin named Akeakamai—Ake for short—an artificial language in which sweeping hand gestures are the words (Herman, Richards, & Wolz, 1984). Each gesture symbolizes an *object* such as "Frisbee," an *action* such as "fetch," or a *description of position* such as "over" or "left." Ake has learned more than fifty of these gesture-words. To test whether Ake is capable of comprehending complex features of language, the

Language in Other Species: Kanzi

Researcher Sue Savage-Rumbaugh has taught Kanzi, a chimp, to communicate using symbols on a special keyboard. Kanzi is unusual because he can also respond to spoken commands like "Please bring me the flashlight."

Talking to the Animals

Although nonhuman species have not yet demonstrated the ability to carry on conversations like this one, growing evidence suggests that some species of animals, including dolphins, comprehend several basic aspects of language. (*Source:* FAR SIDE copyright 1993 FARWORKS, INC. Dist. by UNIVERSAL PRESS SYNDICATE. Reprinted with permission. All rights reserved.)

"Sorry, ma'am, but your neighbors have reported not seeing your husband in weeks. We just have a few questions, and then you can get back to your canning."

researchers established a set of rules on word order and the grammatical function of each type of gesture. They discovered that Ake comprehends word order and syntax in sequences of up to five gestures. For example, RIGHT BASKET LEFT FRISBEE FETCH instructs Ake to take the Frisbee on her left to the basket on her right. More impressively, when familiar gestures are rearranged to form new commands that Ake has never seen before, she continues to respond correctly.

Herman has continued to probe Ake's language comprehension through the use of *anomalous sentences*—sentences that are grammatically incorrect, use nonsense words, or make impossible requests, such as asking her to fetch an immovable object. These procedures are often used to test children's comprehension of language. In one instance, Herman and his colleagues issued a series of commands to Ake that consisted of either grammatically correct sequences or anomalous sequences (Herman, Kuczaj, & Holder, 1993). Interestingly, Ake was highly accurate in responding to requests that were grammatically correct and rarely refused to carry them out. In contrast, she refused nearly all of the anomalous requests, making no attempt to respond to them. It appeared as if Ake recognized that the requests were "silly," a response often observed in children who are presented with anomalous sentences. Although dolphins may be a long way from achieving the level of language proficiency illustrated in the cartoon above, it is clear that they are capable of comprehending features of language that go beyond the forms of behavior observed in the earlier studies of animal language.

Growing evidence from research with these highly intelligent animals suggests that language may not be a uniquely human possession, but rather a continuum of skills that different species of animals exhibit to varying degrees. However, many behavioral scientists remain unconvinced (Gisiner & Schusterman, 1992). The results of further studies will undoubtedly shed additional light on this controversial issue. In the meantime, the question of whether we'll soon "talk with the animals" remains largely unresolved.

Key Points

- According to the linguistic relativity hypothesis, language actually shapes or determines thought. Existing evidence does not offer strong support for this hypothesis.
- Growing evidence suggests that some species of animals, including bonobo chimpanzees and dolphins, are capable of grasping basic aspects of language such as word order and grammar.

Making Psychology Part of Your Life

Making Better Decisions

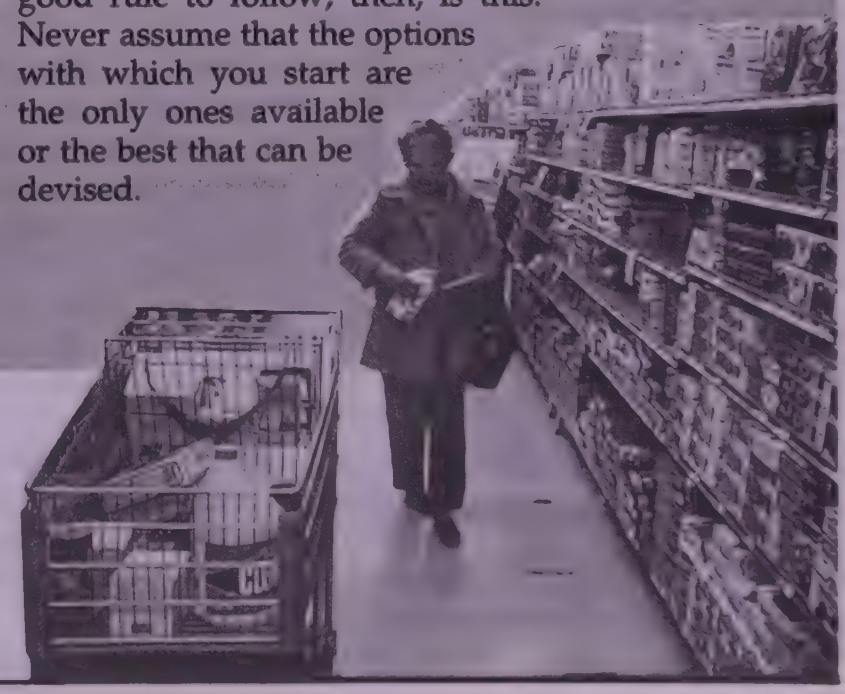
Have you ever made a bad decision—one that you later wished you could change? Unless you have led a charmed life, you probably have. And since decisions often have important consequences, such errors in judgment may prove quite costly. Given the vast complexity of the world and the diversity of options we often face, it is unlikely that anyone can provide you with a perfect system for making correct decisions. Nevertheless, here are some guidelines for increasing the chances that many of your decisions will be good ones—or at least as free from sources of error and bias as possible.

1. *Don't trust your own memory*, or *beware of availability*. When we make decisions, we can do so only on the basis of the information available to us. Be careful! The information that comes most readily to mind is not always the most useful or revealing (Kahneman & Tversky, 1982). When you face an important decision, therefore, jog your memory in several ways and, if time permits, consult written documents or sources before proceeding. As noted in chapter 6, memory often plays tricks on us, and relying on a quick scan of it when making an important decision can be risky.

2. *Don't take situations at face value*, or *question all anchors*. In many decision-making situations the stage is set long before we come on the scene. The asking price for a house or car is set by the seller, the number of meetings for a committee has been determined by its chair, and so on. While you can't always change such givens, you should at least recognize them for what they are and question whether they make sense. If you don't raise such questions, you will probably accept these "anchors" implicitly and then offer only minor adjustments to them (Northcraft & Neale, 1987). This can be a mistake! It may lead you to decisions that work against your own best interests. So whenever and to whatever extent you can, question all proposed anchors.

3. *Remain flexible*, or *don't fall in love with your own decisions*. Making decisions is effortful, so once they are made we tend to heave a sigh of relief and to stick with them—through thick and thin. Then, before we know it, we may have too much invested to quit. In other words, we may be trapped in a situation where we ought to change our initial decision and cut our losses but where, instead, we continue down the path to ruin—or at least to negative outcomes (Brockner & Rubin, 1985). Don't let this happen! It's always difficult to admit a mistake, but doing so is often far better than sticking to a losing course of action.

4. *Consider all options*, or *is half an orange always better than none?* When you make a decision, you must choose among the available options. But what, precisely, are they? Sometimes they are not all out on the table when you begin. Thus, a useful strategy is to start by gathering as much information as you can and then to use it to generate as many potential options as possible. Doing so can often suggest choices or courses of action that you did not consider at first. For example, suppose two cooks are both preparing dishes that require an orange, yet there is only one orange available. What do they do? The obvious answer: cut it in half. But what if one needs only the juice and the other only the peel? Now a very different option exists: give the juice to one cook and the peel to the other. This kind of integrative option is often not apparent at first glance, so only careful consideration will suggest it (Pruitt & Rubin, 1986). A good rule to follow, then, is this: Never assume that the options with which you start are the only ones available or the best that can be devised.



We make decisions every day, some relatively trivial (such as which brand to buy in the supermarket), some relatively important (such as which job offer to accept). How can you improve *your* decision-making skills?

Summary and Review of Key Points

Thinking

Key Terms:

cognition, p. 256
concepts, p. 257
artificial concepts, p. 257
natural concepts, p. 257
prototypes, p. 258
visual images, p. 258
propositions, p. 259
reasoning, p. 260
syllogistic reasoning, p. 260
oversight bias, p. 263
confirmation bias, p. 264
hindsight effect, p. 264

- Concepts are mental categories for objects, events, or experiences that are similar to one another in one or more respects.
- Artificial concepts can be clearly defined by a set of rules or properties. Natural concepts cannot; they are usually defined in terms of prototypes—the most typical category members.
- Propositions, sentences that can stand as separate assertions, are useful for relating one concept to another, or one feature of a concept to the entire concept. Images, or mental pictures, are a basic element of thinking.
- Reasoning involves transforming available information to reach specific conclusions. Formal reasoning derives conclusions from specific premises. In contrast, everyday reasoning is more complex and less clear-cut.
- Cultural factors and beliefs often take precedence over formal logic.
- Reasoning is subject to several forms of error and bias. It can be distorted by emotion and belief, a selective focus on certain sources of information (oversight bias), the tendency to focus primarily on evidence that confirms our beliefs (confirmation bias), and the tendency to assume that we could have predicted events more successfully than is the case (hindsight effect).
- The ecological approach focuses on how animals solve cognitive problems that are important to their survival.

Making Decisions

Key Terms:

decision making, p. 267
expected utility, p. 267
heuristics, p. 267
availability heuristic, p. 267
representativeness heuristic, p. 268
anchoring-and-adjustment heuristic, p. 269
framing, p. 269
escalation of commitment, p. 271

- We do not make all decisions on the basis of expected utility, the product of the probability and the subjective value of each possible outcome. Instead, we often use heuristics, or mental rules of thumb.
- The availability heuristic is our tendency to gauge the frequency or likelihood of various events in terms of how readily they can be brought to mind.
- The representativeness heuristic is the tendency to assume that the more closely an item resembles the most typical examples of some concept, the more likely it is to belong to that concept.
- The anchoring-and-adjustment heuristic is the tendency to reach decisions by making adjustments to reference points or existing information.
- Decisions can also be strongly affected by framing, the presentation of information about possible outcomes in terms of gains or losses.
- People often become trapped in bad decisions through escalation of commitment, an effect that derives from reluctance to admit past mistakes and a desire to justify past losses.

Problem Solving and Creativity

Key Terms:

problem solving, p. 274
trial and error, p. 276
algorithm, p. 276
means-ends analysis, p. 276
analogy, p. 276
functional fixedness, p. 277
mental set, p. 279
creativity, p. 279
divergent thinking, p. 279

- Problem solving involves efforts to develop or choose among various responses in order to attain desired goals. Problems can be solved through trial and error or through the use of algorithms—rules that will, if followed, yield solutions in given situations.
- Heuristics are rules of thumb we often use to solve problems.
- Both functional fixedness—the tendency to think of using objects only as they have been used before—and mental sets—tendencies to stick with familiar methods—can interfere with effective problem solving.
- Creativity involves cognitive activity that results in new or novel ways of solving problems. Creativity seems to entail careful preparation, or hard work on the problem; incubation, or time away from the problem; flashes of illumination; and refinement of proposed solutions through testing.
- Creative breakthroughs seem to stem from divergent thinking—thinking that moves away from conventional knowledge or wisdom.

convergent thinking, p. 279 artificial intelligence, p. 281 neural networks, p. 282	• Creativity can be encouraged by development of a rich knowledge base, independence, curiosity, the use of analogies, and positive affect. • Artificial intelligence is an interdisciplinary field concerned with the capacity of computers to demonstrate intelligent performance. • The primary advantage of neural networks—highly interconnected elementary computational units—stems from the overall pattern created by millions of individual units working together in parallel.
LANGUAGE Key Terms: language, p. 282 phonemes, p. 283 morphemes, p. 283 syntax, p. 283 surface structure, p. 283 deep structure, p. 283 phonological development, p. 285 semantic development, p. 285 grammar, p. 285 babbling, p. 285 phonological strategies, p. 286 fast mapping, p. 286 linguistic relativity hypothesis, p. 287	• Language involves the ability to use a rich set of symbols, plus rules for combining these, to communicate information. It includes the abilities to produce and to comprehend speech. • Language seems to involve both spoken words and rules of grammar (surface structure) and underlying meaning (deep structure). • Contrasting theories of language development suggest that language is acquired by children through (1) social learning, (2) innate mechanisms, or (3) cognitive mechanisms. Evidence suggests all three may play a role. • Language acquisition involves phonological development—learning to produce speech; semantic development—learning to understand the meaning of words and sentences; and acquisition of grammar—the rules through which words can be combined into sentences in a given language. • According to the linguistic relativity hypothesis, language shapes or determines thought. Existing evidence does not support this hypothesis. • Growing evidence suggests that some species of animals, including bonobo chimpanzees and dolphins, are capable of grasping basic aspects of language such as word order and grammar.

CRITICAL THINKING QUESTIONS

APPRAISAL	Throughout this chapter, we've seen that human thought processes are suboptimal in several important respects. For example, reliance on heuristics often provides efficient but flawed decision making. And we often fall prey to biases that lead us astray in our ability to think and reason correctly. What can psychologists do to help people reduce or eliminate the effects of these errors?
CONTROVERSY	The results of many studies demonstrate that animals are capable of grasping important grammatical concepts that many believed were beyond their capabilities. Do you think it is possible that in the coming years scientists will discover a way to "talk with the animals"? If so, why? If not, why not?
MAKING PSYCHOLOGY PART OF YOUR LIFE	Now that you understand the basic nature of cognitive processes and the many factors that affect them, can you think of ways in which you can use this knowledge to improve your problem-solving abilities? Name several specific steps you could take to become more proficient in this respect. How about creativity? Can you use the information in this chapter to enhance your own creativity?

Human Development I:

The Childhood Years

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- Prenatal Influences on Development: When Trouble Starts Early
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8

SPECIAL SECTIONS

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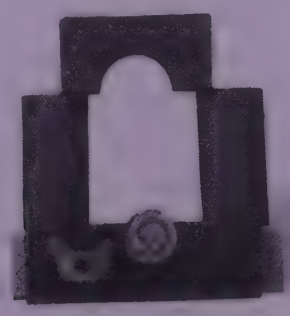


Change, it is often said, is the only constant. And where human beings are concerned, this is certainly true. Stop for a moment and think about the many ways in which *you've* changed over the course of your life, or even during the past few years. If you do, you'll be struck by both the scope and the magnitude of these alterations. Some of these changes are obvious—you've grown in size and matured sexually. Others, in contrast, are less apparent—you've acquired a tremendous amount of knowledge, learned to think in far more complex and sophisticated ways, formed a personal code of ethics, and developed a much deeper understanding of human relationships.

CHANGE: THE ONLY CONSTANT OF LIFE

As this cartoon suggests, we change in many ways over time—and not all of them are ones we prefer!
(*Source:* Drawing by Victor; © 1993 The New Yorker Magazine, Inc.)

Not all the changes we experience as we grow older are positive of course, but in a very real sense, change is a basic part of human existence: We are all in a continuous state of flux as we move through life's journey.

CHANGE IS A BASIC PART OF HUMAN EXISTENCE: WE ARE ALL IN A CONTINUOUS STATE OF FLUX AS WE MOVE THROUGH LIFE'S JOURNEY.

The field of **developmental psychology** focuses on such change. In this chapter and the next one, we will examine some of its major findings. While the changes we experience throughout life seem countless, developmental psychologists have found it helpful to consider these shifts under three major categories: **physical growth and development**, **cognitive development**, and **social and emotional development**. These terms refer, respectively, to changes in the physical size and structure of our bodies; changes in our mental abilities and functioning; and changes in our emotional reactions to, and relations with, other persons. In this chapter, we'll consider such changes as they occur during **childhood**—the years between birth and adolescence. In the next chapter, we'll examine changes occurring during adolescence and our adult years.

An additional topic to which we'll devote special attention involves changes in all three dimensions—that is, in physical, cognitive, and social development. This is *gender*, or *sex-role*, *development*, the process through which children learn that they belong to one of the two sexes and acquire knowledge of the behaviors and attitudes associated, in their culture, with being "feminine" or "masculine." We'll examine this process here, then return to some of its long-lasting effects in chapter 11.

PHYSICAL GROWTH AND DEVELOPMENT

Developmental Psychology: *The branch of psychology that studies all types of changes occurring throughout the life span.*

Physical Growth and Development: *Physical changes in the size and structure of our bodies between conception and adulthood.*

When does human life begin? In one sense, this is a philosophical or religious issue, and thus outside the realm of science. From a purely biological point of view, though, your life as an individual began when one of the millions of sperm released by your father during sexual intercourse fertilized an *ovum* deep within your mother's body. The product of this union was barely 1/175 of an inch in diameter—smaller than the period at the end of this sentence. Yet packed within this tiny speck were the genetic blueprints—twenty-three chromosomes from each of your parents—that guided all your subsequent physical growth.

THE STAGES OF PRENATAL DEVELOPMENT

This series of photos illustrates prenatal development, from fertilization to the embryo at seven weeks and the fetus at twenty-two weeks.

THE PRENATAL PERIOD

After fertilization, the ovum moves through the mother's reproductive tract until it reaches the womb, or *uterus*. This trip takes several days, and during this time the ovum divides again and again. Ten to fourteen days after fertilization, the ovum becomes implanted in the wall of the mother's uterus. For the next six weeks it is known as the **embryo** and develops at a rapid pace. By the third week a primitive heart has formed and begun to beat. By the fourth week the embryo is about one-fifth of an inch (one-half centimeter) long, and the region of the head is clearly visible. Rapid growth continues, and by the end of the eighth week the embryo is about one inch long, and a face as well as arms and legs are present. By this time, too, all major internal organs have begun to form and some, such as the sex glands, are already active. The nervous system develops rapidly, and simple reflexes begin to appear during the eighth or ninth week of life.

During the next seven months the developing child—now called a **fetus**—shows an increasingly human form. The external genitals take shape, so the sex of the baby is recognizable externally by the twelfth week. Fingernails and toenails form, hair follicles appear, and eyelids that open and close emerge. Physical growth is impressive, too. By the end of the twelfth week the fetus is 3 inches (7.6 centimeters) long and weighs about 3/4 ounce (21 grams). By the twentieth week it is almost 10 inches (25 cm) long and weighs 8 or 9 ounces (227–255 g). By the twenty-fourth week all the neurons that will be present in the brain have been produced. The eyes are formed and are sensitive to light by the end of the twenty-fourth to twenty-sixth week.

During the last three months of pregnancy, the fetus gains about eight ounces each week and grows rapidly. By the seventh and eighth months, it appears to be virtually fully formed. However, if born prematurely at this time, it may still experience difficulties in breathing, because the *alveoli*, tiny air sacs within the lungs, are not yet fully formed. At birth babies weigh more than 7 pounds (3.17 kilograms) on average and are about 20 inches (50.8 cm) long.

Cognitive abilities, too, appear to take shape during the prenatal period. In an ingenious series of studies, DeCasper and his colleagues (e.g., DeCasper & Fifer, 1980; DeCasper & Spence, 1986) arranged for mothers-to-be to read *The Cat in the Hat* to their unborn children two times each day during the last six weeks of pregnancy. At the end of that period, the heart rate of each fetus was measured as recordings of the familiar story and of an unfamiliar story were played. Results indicated that the familiar story produced a slight decrease in fetal heart rate, while the unfamiliar one produced a slight increase. A decrease in heart rate is often a sign of increased attention, so these findings suggest that the fetuses could indeed distinguish between the familiar and unfamiliar stories.

Cognitive Development: *Changes in cognitive abilities and functioning occurring as individuals grow older.*

Social and Emotional Development: *Changes in emotional experiences and expressions, and in behaviors and attitudes toward others, occurring with age.*

Childhood: *The period between birth and adolescence.*

Embryo: *The developing child during the second through the eighth week of prenatal development.*

Fetus: *The developing child during the last seven months of prenatal development.*

Prenatal Influences on Development: When Trouble Starts Early

Under ideal conditions development during the prenatal period occurs in an orderly fashion, and the newborn child is well equipped at birth to survive outside its mother's body. Unfortunately, however, conditions are not always ideal. Many environmental factors can damage the fetus and interfere with normal patterns of growth. Such factors are known as **teratogens**, and their impact can be devastating.

Disease during Pregnancy The blood supply of the fetus and that of its mother come into close proximity in the **placenta,** a structure within the uterus that protects and nourishes the growing child. As a result, disease-producing organisms present in the mother's blood can sometimes infect the developing child. Tragically, diseases that exert only relatively minor effects on mothers can be very serious for the fetus. For example, *rubella,* or German measles, can cause blindness, deafness, or heart disease in the fetus if the mother contracts this illness during the first four weeks of pregnancy. Other diseases that can be transmitted to the fetus and inflict serious damage include chicken pox, mumps, tuberculosis, malaria, syphilis, and herpes (Samson, 1988).

Since the early 1980s, AIDS (acquired immune deficiency syndrome) has been added to this list. At present, thousands of babies infected with this disease are born each year in the United States alone. The prognosis for such infants is dismal. They are often born with a wide range of serious birth defects and show a pattern of physical abnormalities, including a prominent boxlike forehead, a small head, and widely spaced, diagonally oriented eyes (Novick, 1989). Few babies born with AIDS survive for more than five to eight months (Minkoff et al., 1987). Thus, tragically, their lives are ended almost before they have begun.

Prescription and Over-the-Counter Drugs The use of drugs by the mother can also exert important effects on the developing fetus. Excessive use of aspirin, a drug most people take without hesitation, can result in harm to the fetus's circulatory system (Kelsey, 1969). Caffeine, the stimulant found in coffee, tea, and many soft drinks, may also exert harmful effects. Some evidence suggests that caffeine can slow fetal growth and contribute to premature birth (Jacobson et al., 1984). Additional findings indicate that children born to mothers who consume large amounts of caffeine show increased irritability and a higher than normal incidence of vomiting (Aaronson & MacNee, 1989).

Illegal Drugs The widespread use of heroin, cocaine, crack, and other illegal drugs is a tragedy of the 1990s, one that is magnified in the case of the developing fetus. Growing evidence suggests that the use of such drugs by prospective mothers can be truly disastrous (Samuels & Samuels, 1986). Infants born to heroin-addicted mothers suffer from numerous problems, including physical malformations, respiratory disease, and premature birth. It is estimated that almost 400,000 babies addicted to cocaine or its derivatives are born in the United States each year (Reid, 1990), and these infants, too, suffer from a wide range of physical problems, including low birth weight, breathing difficulties, and physical defects (Chasnoff et al., 1989). Given that they are usually born to mothers who are also poor and malnourished, the outlook for such youngsters is bleak.

Teratogens: *Factors in the environment that can harm the developing fetus.*

Placenta: *A structure that surrounds, protects, and nourishes the developing fetus.*

The Fetal Alcohol Syndrome Although consumption of alcohol is legal in most countries, the harm it can produce is just as devastating as that of the illegal drugs considered above. Children born to mothers who make heavy use of this drug sometimes suffer from a disorder known as the *fetal alcohol*

syndrome (FAS) (Aaronson & MacNee, 1989). FAS includes severely retarded growth, damage to the brain and the rest of the nervous system, and distortions in the normal shape of the face, including widely spaced eyes, short eyelid openings, a small, upturned nose, and a thin upper lip. In many cases only some of these problems are present; for example, an infant may show low body weight and size, but no facial distortions. Such infants are described as suffering from *fetal alcohol effects*, but not from the full-blown fetal alcohol syndrome itself (Hoyseth & Jones, 1989).

How much must a woman drink before such effects are produced? This is a tricky question. Many factors probably play a role, such as susceptibility of the fetus to the impact of alcohol and the mother's health. However, research findings indicate that two ounces of alcohol a day taken very early in pregnancy can produce FAS-like facial features (Astley et al., 1992).

Smoking While the proportion of adults who smoke has decreased in the United States and several other nations, this figure is increasing in many parts of the world (see chapter 13). Moreover, the proportion of *women* who smoke is rising even while the proportion of *men* who smoke is steady or decreasing (Merritt, 1981). From the point of view of fetal development, this is indeed unfortunate, for smoking by future mothers is related to a wide range of harmful effects for both the fetus and the newborn child. These include decreased birth weight and size and spontaneous abortion (Aaronson & MacNee, 1989). Smoking increases the concentration of carbon monoxide in the bloodstreams of both mother and fetus. Increased carbon monoxide, in turn, displaces oxygen from red blood cells and may damage the central nervous system of the fetus (Nash & Persaud, 1988).

Physical and Perceptual Development during Our Early Years: *Infancy and Childhood*

Physical growth is rapid during infancy. Assuming good nutrition, infants almost triple in weight (to about 20 pounds or 9 kilograms) and increase in body length by about one-third (to 28 or 29 inches, 71 to 74 cm) during the first year alone.

Newborns possess a number of simple reflexes at birth. They can follow a moving light with their eyes, suck on a finger or nipple placed in their mouth, and turn their head in the direction of a touch on the cheek. In addition, they can grasp a finger placed in their palms and will make stepping motions if held so that their feet barely touch a flat surface. Their ability to move about and reach for objects is quite limited, but this situation changes quickly. Within a few months they can sit and crawl. And as harried parents quickly learn, most infants are quite mobile by the time they are fourteen or fifteen months old. Figure 8.1 (on page 300) summarizes several milestones of motor development. It's important to keep in mind that the approximate ages indicated are merely *average* values. Departures from them are of little importance unless they are quite extreme.

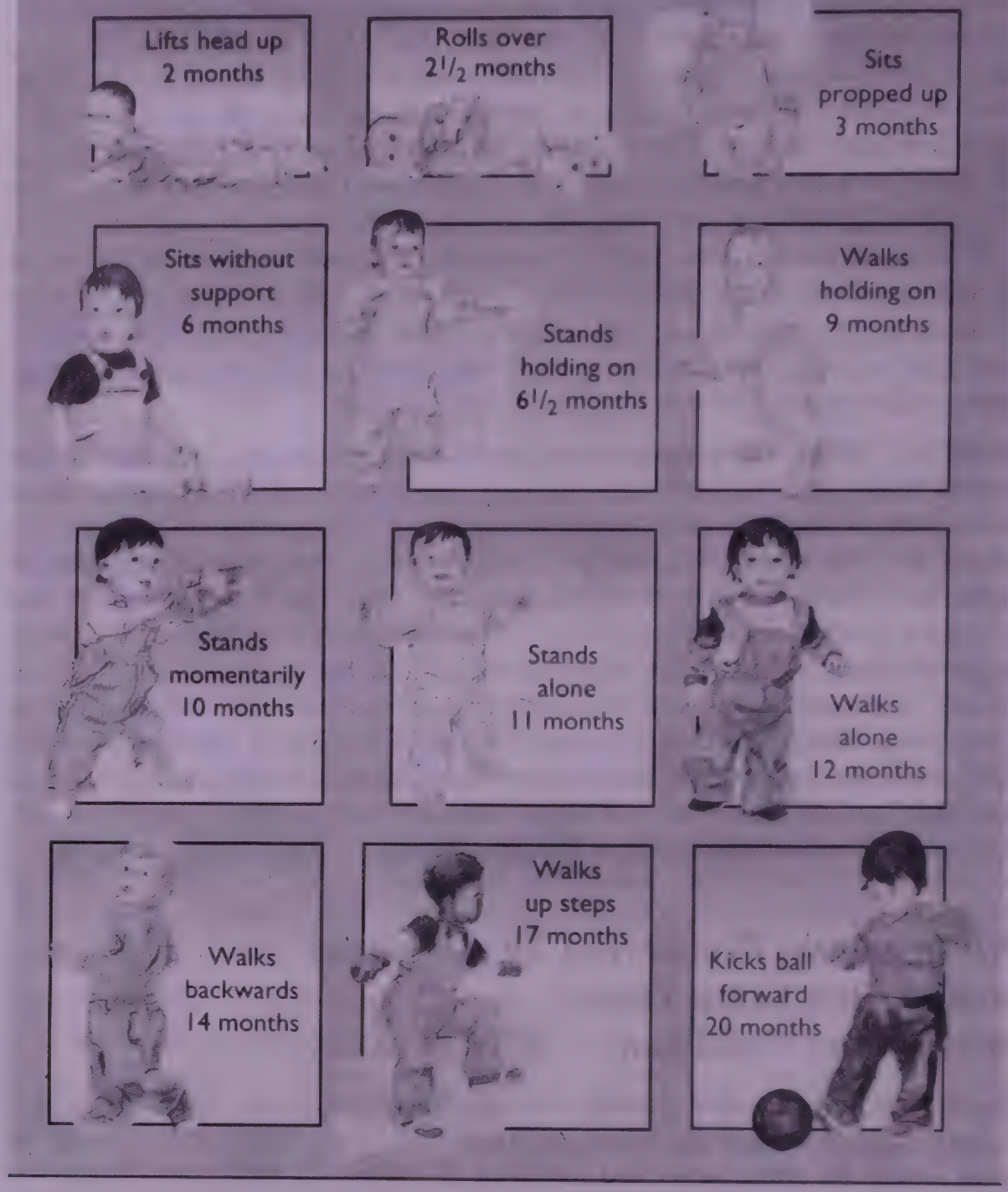
After the initial spurt of the first year, the rate of physical growth slows considerably; both boys and girls gain about 2 to 3 inches (5 to 10 cm) and 4 to 7 pounds (2 to 4 kg) per year. The rate accelerates during adolescence, when both sexes experience a *growth spurt* lasting about two years.

Learning Abilities of Newborns Can newborns show the kinds of learning discussed in chapter 5? Evidence concerning *classical conditioning* suggests that they can, but that such conditioning occurs most readily for

FIGURE 8.1

Milestones of Motor Development

Some highlights of motor development. Please note that the approximate ages shown here are only *averages*. Most children will depart from them to some extent; departures are of little importance unless they are extreme.
(*Source:* Frankenberg & Dodds, 1967.)



stimuli that have survival value for babies. For example, infants only two hours old readily learn to associate gentle stroking on the forehead with a sweet solution and after these two stimuli have been paired repeatedly will show sucking responses to the stroking (the conditioned stimulus) (Granchrow, Steiner, & Daher, 1983). In contrast, until they are at least eight months old, human infants do not readily acquire conditioned fears. Remember little Albert, discussed in chapter 5, who acquired fear of a rabbit (the conditioned stimulus) after it was paired with a loud sound (the unconditioned stimulus)? He was eleven months old at the time the study was conducted. Why don't infants acquire conditioned fears below this age? Perhaps because doing so has little survival value for them: They lack the motor skills needed to escape from unpleasant events, so acquiring such fears would do them little good (Berk, 1993).

Turning to *operant conditioning*, there is considerable evidence that newborns can readily demonstrate this basic kind of learning. For example, they readily learn to suck faster to see visual designs or hear music and human voices (Rovee-Collier, 1987). And by the time infants are two months old, they will move their heads against a pressure-sensitive pillow in order to produce movements in a mobile hung above their cribs (Watson & Ramey, 1972).

Newborn Imitating Adult Facial Expressions

Research by Dr. Nadja Reissland-Burghart has shown that newborns only a few minutes old can imitate facial expressions, such as widened and pursed lips.

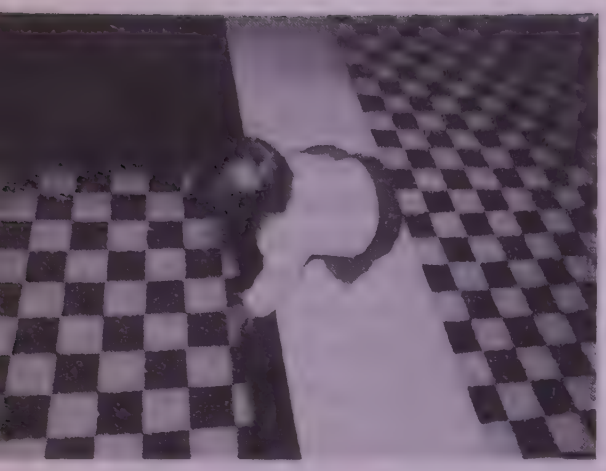
Additional evidence even indicates that newborns are capable of *imitation*. In a series of well-known studies, Meltzoff and his colleagues (Meltzoff & Moore, 1977, 1989) demonstrated that infants between twelve and twenty days of age could imitate facial gestures shown by an adult—for example, sticking out their tongues or opening their mouths. Indeed, in one well-conducted study, infants tested only a few minutes after birth showed imitation of two facial expressions: widened lips and pursed lips (Reissland, 1988).

Perceptual Development How do infants perceive the world around them? Do they recognize form, see color, and perceive depth in the same manner as adults? Infants can't talk, so it is necessary to answer such questions through indirect methods, such as observing changes in their heart rate, their sucking responses, or the amount of time they spend gazing at various stimuli. For example, it has been found that after infants have seen a visual stimulus several times, they spend less time looking at it when it is presented again than they do at a new stimulus they have never seen before. This fact provides a means of determining whether infants can detect a difference between two stimuli. If they can, then after seeing one stimulus repeatedly, infants should spend less time looking at it than at a new stimulus when both are presented together. If they cannot, they should look equally at both stimuli. Studies based on this premise have determined that newborns can distinguish between different colors (Adams, 1987), odors (Balogh & Porter, 1986), tastes (Granchrow, Steiner, & Daher, 1983), and sounds (Morrongiello & Clifton, 1984). Infants as young as three days old will turn their eyes and heads in the direction of a sound. Moreover, they are especially sensitive to auditory stimuli within the frequency range of normal human speech. Indeed, they can even distinguish between such similar sounds as "ba" and "ga" (Eimas & Tarter, 1979). However, infants have higher thresholds than adults for detecting specific sounds, apparently because they do not listen selectively for such sounds (Bargones & Werner, 1994).

Infants also show impressive abilities with respect to *form* or *pattern* perception. In now classic research on this topic, Fantz (1961) showed babies six months old a variety of visual patterns. By observing how long they fixated visually on each, he determined that the babies had a clear preference for patterned as opposed to plain targets and that they seemed to prefer the human face over all other stimuli tested. Subsequent research has indicated that recognition of faces may develop even earlier. By two months of age, infants prefer a face with features in normal locations over one with scrambled features (Maurer & Barrera, 1981). By

Key Points

- Physical growth is rapid during the prenatal period.
- Many environmental factors, including diseases, drugs, alcohol, and smoking by prospective mothers can adversely affect the developing fetus.
- Infants and newborns can distinguish among different colors, sounds, and tastes, and they prefer certain patterns—for example, the human face—over others.
- By the time they are two or three months old, infants also have the ability to perceive depth.



THE VISUAL CLIFF: STUDYING INFANT DEPTH PERCEPTION

Infants six or seven months old refuse to crawl out over the deep side of the *visual cliff*. This indicates that they can perceive depth.

three months they can distinguish between their mother's face and that of a stranger, and even distinguish one stranger's face from another (Barrera & Maurer, 1981a). As babies grow older, they prefer increasingly complex patterns, such as a checkerboard containing many squares rather than one containing a smaller number of larger squares (Brennan, Ames, & Moore, 1966).

The ability to perceive depth, too, seems to develop rapidly in the months immediately after birth. Early studies on *depth perception* employed an apparatus known as the *visual cliff* (Gibson & Walk, 1960). As you can see from the photo, the patterned floor drops away on the deep side of the cliff. A transparent surface actually continues across this chasm, so there is no actual drop—and no real danger. Yet human infants six or seven months old refuse to crawl across the deep side to reach their mothers, thus indicating that they perceive depth by this time. Does this perceptual ability appear prior to this age? Since younger infants can't crawl across the cliff even if they want to, it is necessary to use other methods to find out. Such research has been performed and indicates that depth perception may first appear when infants are about three months old (Fox et al., 1979; Yonas, Arterberry, & Granrud, 1987).

In sum, shortly after birth, infants have sophisticated abilities to interpret complex sensory input. How do they then integrate such information into cognitive frameworks for understanding the world? This is the question we will consider next. Before turning to *cognitive development*, however, let's look at the basic research methods used by psychologists in their efforts to understand all aspects of human development. These methods are described in the **Research Process** section below.

THE RESEARCH PROCESS

Basic Methods for Studying Human Development

That human beings, and especially children, change with the passage of time is obvious. But how can we map the course of such change and identify the factors that affect it? Developmental psychologists employ several different methods for answering such questions. We'll examine the most important methods here and will consider the relative strengths and potential weaknesses of each one.

LONGITUDINAL RESEARCH: STUDYING THE SAME INDIVIDUALS ACROSS TIME

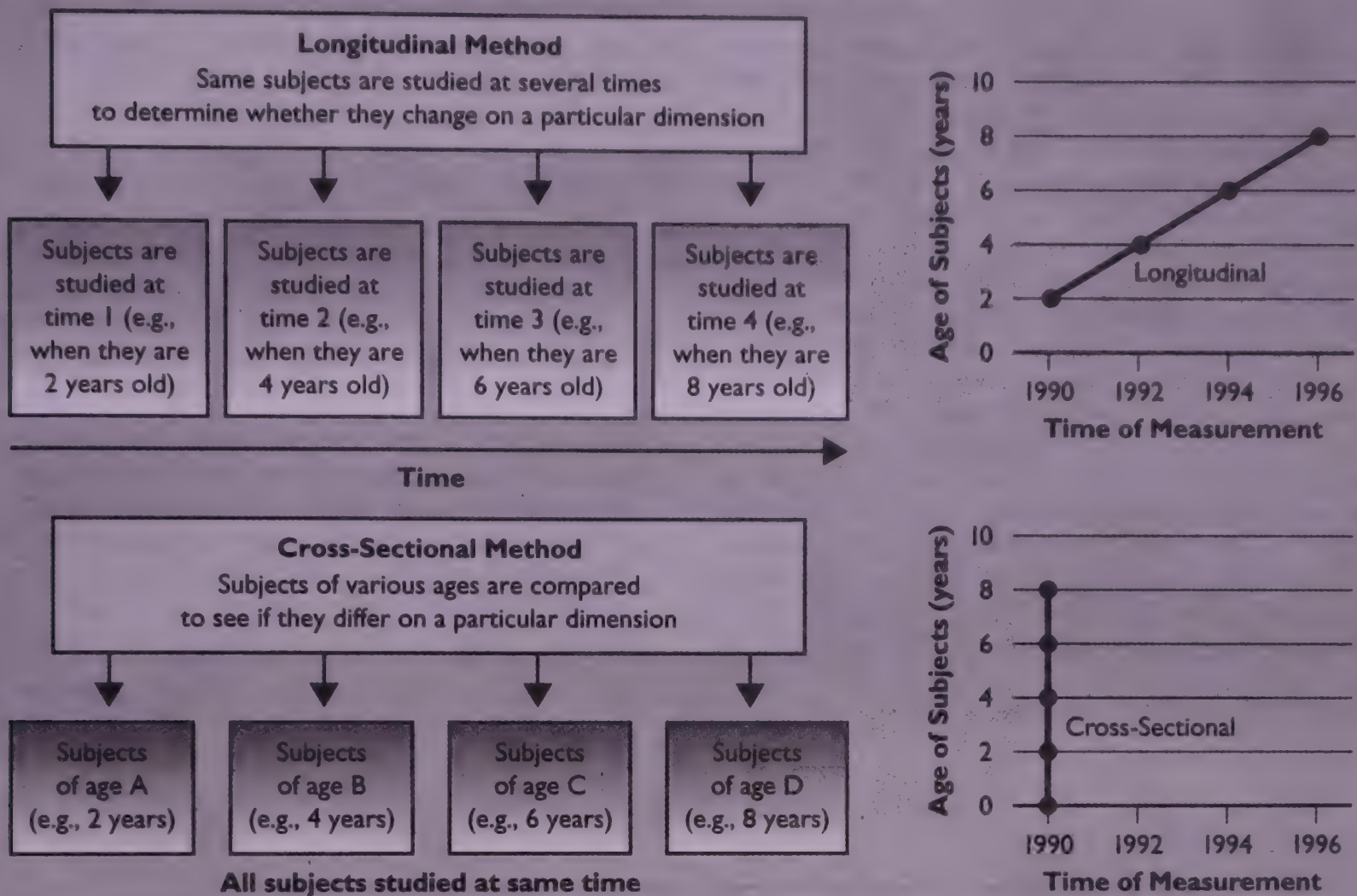
One basic technique for studying development is known as **longitudinal research**. This is research in which the same individuals are studied over substantial periods of time (see Figure 8.2). For example, researchers might identify two groups of children, one being cared for by their own mothers and the other cared for in day-care centers, and then study them over several years to determine whether the groups differ with respect to various aspects of cognitive development—for example, their language skills or their ability to solve certain kinds of problems.

Longitudinal research offers important advantages. First, since the same persons are tested or observed repeatedly, individual variations in the course of development can be observed. Second, because the same persons are studied over relatively long periods of time, it may be possible to draw conclusions about how specific events influence the course of subsequent development.

There are several potential disadvantages, too, however. The first of these is the problem of *subject attrition*—the loss of some participants over the course of the project. In the day-care example, families may move, break up, or lose interest, causing their children to be removed from the sample. As a result, the youngsters who remain in the study may be different in important respects from those who withdraw. To the extent this is true, then any differences between the mother and day-care groups may be due to this factor, *not* to being raised at home or in day-care centers. Another potential problem is *practice effects*. People who are tested or observed repeatedly may gradually become very familiar with the kind of tasks

Basic Methods of Studying Human Development FIGURE 8.2

In the *longitudinal method*, the same individuals are studied across time. In the *cross-sectional method*, persons of different ages are studied at one time.



used in the research. Again, to the extent such effects occur, the results obtained may be invalid.

Cross-Sectional Research: Studying Persons of Different Ages at One Time

Now, let's consider another way of studying the mother/day-care question. Instead of following the development of two groups of youngsters for several years, we might instead simply compare children of *different ages* who have received care from their mothers or in day-care centers. For example, we might compare three-year-olds, four-year-olds, and five-year-olds raised under each condition, to determine whether they differ with respect to cognitive development at each age. This is an example of **cross-sectional research**—research in which people of different ages are studied at the same point in time (refer to Figure 8.2).

Cross-sectional research, too, offers several advantages. It can be conducted much more quickly than longitudinal research. Indeed, the only time required is that for collection of the data from participants of different ages. Also, since participants are tested only once, practice effects of the kind described above are minimized.

Unfortunately, cross-sectional research has several disadvantages, too. Perhaps the most important of these involves what are known as **cohort effects**. That is, differences between groups of persons of different ages may derive not merely from differences in age but from the fact that the people were born at different times and have been exposed to contrasting life experiences and cultural conditions. Such differences may be small among children who are currently three, four, and five years old. But suppose we are interested in comparing people who are sixty-five, forty-five, and twenty-five to find out, for example, how sexual behavior changes over the life span. Individuals in these three groups certainly differ in age. But they also differ in terms of their life experience.

As an illustration of such complexities, imagine that research results indicate that people who are sixty-five engage in a narrower range of sexual practices than persons who are twenty-five. Is this finding due to the age difference between them? Perhaps. But it may also be due to the fact that the older group grew up at a time when society expressed much less tolerance for many forms of sexual behavior than was true during later periods. In this manner, cohort

effects sometimes make it difficult to interpret the findings of cross-sectional research.

Summing Up, and an Alternative Approach

Faced with the mixed picture of advantages and disadvantages outlined above, developmental psychologists have sought to formulate a research approach that combines the advantages of longitudinal and cross-sectional research while minimizing the disadvantages of each. One such approach is known as the **longitudinal-sequential design**. It involves studying several samples of people of different ages over a period of years. In other words, this technique combines major aspects of both longitudinal and cross-sectional research. Since each sample of participants is studied across time, changes within each can be attributed to development. But since several such samples are studied, researchers can also assess the impact of cohort effects or cultural changes by comparing persons born in different years with one another *at the same age*. Any differences between them can then reasonably be attributed to cohort effects—to the fact that they were born in different years. Another advantage of such designs is that they allow for both longitudinal and cross-sectional comparisons. If the results of both are the same, then we can be quite confident about the validity of these findings. While the longitudinal-sequential design still faces problems of participant attrition, practice effects, and the like, it does offer an additional means for untangling some of the interwoven strands of cultural and individual change. In this respect it is another useful tool available to developmental researchers.

Critical Thinking Questions

1. In recent years, both divorce rates and family mobility (the rate at which families move from one geographic location to another) have increased. What are the implications of these changes for successful use of the longitudinal method of research?
2. Suppose that a cross-sectional study compared people of three age groups (55–60, 30–35, and 15–20) with respect to several cognitive abilities. Results indicated that the two older groups outperform the youngest group. How could these results be interpreted? What follow-up research could be conducted to help clarify the meaning of these results?

Longitudinal Research: *Research in which the same individuals are studied across relatively substantial periods of time, such as years. (p. 302)*

Cross-Sectional Research: *Research comparing groups of persons of different ages in order to determine how some aspect of behavior or cognition changes with age. (p. 303)*

Cohort Effects: *Differences between persons of different ages stemming from the contrasting social or cultural conditions of the periods in which they grew up. (p. 303)*

Longitudinal-Sequential Design: *A research approach in which several groups of individuals of different ages are studied across time.*

Cognitive Development: Changes in How We Know the External World . . . and Ourselves

Do children think, reason, and remember in the same manner as adults? Until well into the twentieth century, it was widely assumed that they do. In most societies it was believed that any differences between the cognitive processes of children and adults are largely ones of degree: Adults are superior mentally just as they are larger physically, but basic cognitive processes remain largely the same throughout life.

These assumptions were vigorously challenged by the Swiss psychologist Jean Piaget. On the basis of careful observations of his own and many other children, Piaget concluded that in several crucial respects children do *not* think or reason like adults. Rather, because they lack certain abilities, their thought processes are different not only in degree but in kind. Piaget's theory of *cognitive development* contains many valuable insights and has guided a great deal of research. Thus, we will consider it in detail here. But it is important to be aware at the outset that many psychologists no longer accept this theory as accurate. Moreover, Piaget's theory has been seriously challenged by a very different approach—one based on the *information processing* perspective we discussed in detail in chapter 6 (Case, 1991). So, after considering Piaget's theory and modern assessments of it, we'll turn to this newer information-processing approach to cognitive development.

Piaget's Theory: An Overview

Piaget's theory of cognitive development is a **stage theory**—a type of theory that proposes that all human beings move through an orderly and predictable series of changes. Stage theories have always been popular in the study of development, and we'll encounter others in this book. In Piaget's theory, the stages involve cognitive functioning, but stage theories have been applied to many other aspects of human behavior as well—notably to the development of personality (see chapter 12). Here I'd like merely to note that many psychologists currently question the ideas, basic to such theories, that (1) all human beings move through a set series of stages; (2) they do so at certain ages; or (3) the order of such progress is unchanging (Flavell, 1985). There simply seems to be too much variability among individuals to enable us to speak with confidence about such orderly patterns of change.

What mechanism, in Piaget's view, underlies cognitive development? In other words, what force keeps us moving through the various stages the theory describes? According to Piaget, the answer is **adaptation**: the process of building mental representations of the world through direct interaction with it. Adaptation, in turn, consists of two basic components. The first of these is **assimilation**, our tendency to fit new information into existing mental frameworks—to understand the world in terms of existing concepts, schemas, and modes of thought. The second is **accommodation**, our tendency to alter existing concepts or mental frameworks in response to new information or new recognizable dimensions of the external world. Piaget suggests that it is the tension between these two components that fosters adaptation and cognitive development—our progress through ever more complex conceptions of the world around us.

Now let's turn to the details of the different stages of cognitive development Piaget described.

The Sensorimotor Stage: Learning to Represent the World Internally The first of Piaget's stages lasts from birth until somewhere between eighteen and twenty-four months. During this period, which Piaget terms the **sensorimotor stage**, infants gradually learn that there is a relationship between their actions and the external world. They discover that they can manipulate objects and produce effects. In short, they acquire a basic grasp of the concept of *cause and effect*. For example, they learn to open their mouths differently for a nipple or a spoon, learn to reach for objects while looking at them, and learn to perform basic motor movements that produce effects on the physical world such as pulling, striking, swinging, and rubbing.

Throughout the sensorimotor period, however, infants seem to know the world only through motor activities and sensory impressions. They have not yet learned to use mental symbols or images to represent objects or events. This results in some interesting effects. For example, if an object is hidden from view, four-month-olds will not attempt to search for it. For such infants, "out of sight, out of mind" seems to be true, at least under some conditions. By eight or nine months of age, however, the situation changes. Infants of this age *will* search for the hidden object. In other words, they have obtained a basic idea of **object permanence**, an understanding that objects continue to exist when they are hidden from view.

The Preoperational Stage: Growth of Symbolic Activity Some time between the ages of eighteen and twenty-four months, Piaget contends, babies acquire the ability to form mental images of objects and events. At the same time, language develops to the point at which a young child begins to think in

Stage Theory: *Any theory proposing that all human beings move through an orderly and predictable series of changes.*

Adaptation: *In Piaget's theory of cognitive development, building mental representations of the world through interaction with it.*

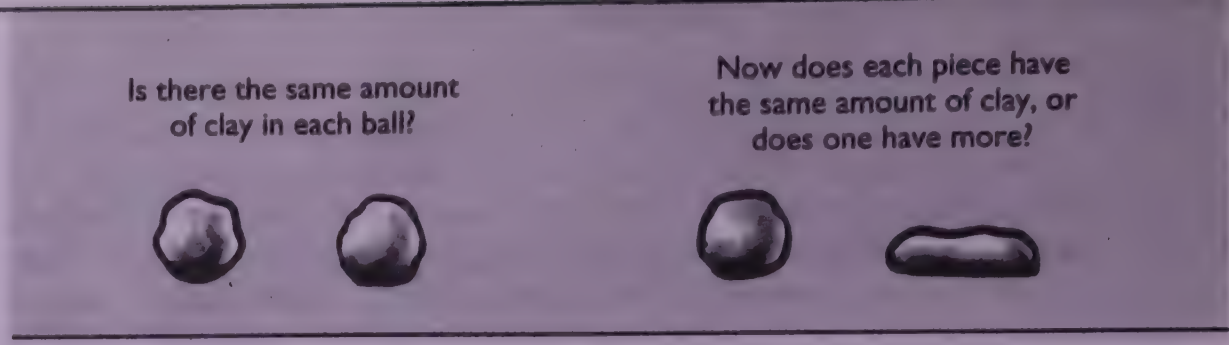
Assimilation: *In Piaget's theory, the tendency to understand new information in terms of existing mental frameworks.*

Accommodation: *In Piaget's theory, the modification of existing mental frameworks to take account of new information.*

Sensorimotor Stage: *In Piaget's theory, the earliest stage of cognitive development.*

Object Permanence: *An understanding of the fact that objects continue to exist when they pass from view.*

FIGURE 8.3



Lack of Understanding of Conservation during the Preoperational Stage

A four-year-old is shown two identical lumps of clay (left). Then one lump is flattened into a large pancake (right). Asked whether the two lumps still contain the same amount of clay, the child may answer "no." Such behavior indicates that the child lacks understanding of the concept of *conservation*.

terms of verbal symbols—words. These developments, Piaget suggests, mark the end of the sensorimotor period and the start of the **preoperational stage**.

During this stage, which lasts until about age seven, children are capable of many actions they could not perform earlier. For example, they begin to demonstrate **make-believe play**, in which they enact familiar activities, such as pretending to eat or go to sleep. In order to show such play, they must be able to represent these activities mentally and translate such representations into overt actions.

While the thought processes of preoperational children are more advanced than those in the preceding stage, Piaget emphasizes that children at this stage of cognitive development are still quite immature in several important respects. First, they are limited by **egocentrism**: They have difficulty understanding that others may perceive the world differently than they do (Piaget, 1975). For example, consider the following demonstration (Flavell, 1973). Two-year-olds are shown a card with a picture of a dog on one side and a cat on the other. The card is then placed between the child and the experimenter so that each can see only one side. Now the experimenter asks the child two questions: "What do you see?" and "What do I see?" Because of their tendency toward egocentric thought, many children indicate that the experimenter sees the same picture they do. As we'll soon see, however, the results obtained in such demonstrations seem to depend strongly on what questions are asked. Under some conditions, even two-year-olds seem capable of recognizing that what other people see may be quite different from what they see (Lempers, Flavell, & Flavell, 1977).

MAKE-BELIEVE PLAY

When they engage in make-believe play, children demonstrate that they can represent everyday activities mentally. According to Piaget, they become capable of such behavior during the preoperational stage.

Preoperational Stage: *In Piaget's theory, a stage of cognitive development during which children become capable of mental representations of the external world.*

Make-Believe Play: *Play in which children pretend to be engaging in various familiar activities, such as eating or going to sleep.*

Egocentrism: *The inability of young children to distinguish their own perspective from that of others.*

Children in the preoperational stage also seem to lack understanding of relational terms such as *darker*, *larger*, or *harder*. Further, they lack *seriation*—the ability to arrange objects in order along some dimension. Finally, and perhaps most important, they lack a grasp of what Piaget terms the principle of **conservation**—knowledge that certain physical attributes of an object remain unchanged even though the outward appearance of the object is altered. For example, imagine that a four-year-old is shown two identical lumps of clay. One lump is then flattened into a large pancake as the child watches. Asked whether the two lumps still contain the same amount of clay, the child may answer "no" (see Figure 8.3). Similar findings occur when children of this age watch water from one of two identical tall containers being poured into a shorter but wider one. When asked whether the remaining tall container and the new shorter one contain the same amount of water, children again answer "No."

The Stage of Concrete Operations: The Emergence of Logical Thought

By the time they are six or seven (or perhaps even earlier, as we'll see below), most children can solve the simple problems described above. According to Piaget, their mastery of conservation marks the beginning of a third major stage of cognitive development—the stage of **concrete operations**. Piaget believes that this is a major turning point in cognitive development, for in

terms of his theory, children at this stage think more like adults than like younger children at earlier stages.

During the stage of concrete operations, which lasts until about the age of eleven, many important skills emerge. Youngsters gain understanding of relational terms and seriation. They come to understand *reversibility*—the fact that many physical changes can be undone by a reversal of the original action. They also begin to make greater use of concepts in describing and thinking about the physical world. Thus, if asked to sort various objects, four-year-olds will often do so in terms of color or size; older children place objects in more complex conceptual categories, ones that take account of several features at once. They will categorize bananas, oranges, apples, and pineapples as fruits, despite major variations in color, shape, and size.

Finally, children who have reached the stage of concrete operations begin to engage in what Piaget would describe as *logical thought*. If asked, "Why did you and your mother go to the store?" they will reply, "Because my mother needed some milk." In short, they provide a logical explanation. Younger children, in contrast, may reply, "Because afterwards, we came home."

THE STAGE OF FORMAL OPERATIONS: DEALING WITH ABSTRACTIONS AS WELL AS REALITY At about the age of twelve, Piaget suggests, most children enter the final stage of cognitive development—the stage of **formal operations**. During this period, major features of adult thought make their appearance. While children in the stage of concrete operations can think logically, it appears that they can do so only about concrete events and objects. In contrast, those who have attained the stage of formal operations can think abstractly; they can deal not only with the real or concrete but with possibilities—potential events or relationships that do not exist, but can be imagined.

During this final stage of cognitive development, children become capable of what Piaget terms **hypothetico-deductive reasoning**. That is, when faced with a problem, young people can formulate a general theory that includes all possible factors. From this they reason *deductively* to formulate specific hypotheses that they can test by examining existing evidence or acquiring new evidence. In addition, persons who reach the stage of formal operations demonstrate **propositional reasoning**. They can assess the logical validity of verbal assertions, even when these refer to possibilities rather than to events in the real world.

While the thinking of older children or adolescents closely approaches that of adults, however, Piaget believes that it still falls short of the adult level. Thus, older children, and especially adolescents, often use their new powers of reasoning to construct sweeping theories of religion, ethics, or politics. While the reasoning in such views may be logical, the theories are often naive, because the individuals who construct them simply don't know enough about life to do a more thorough or sophisticated job.

One final point: while people who have reached the stage of formal operations are capable of engaging in hypothetico-deductive reasoning, propositional reasoning, and other advanced forms of thought, there is no guarantee that they will actually do so. On the contrary, even adults often slip back into less advanced modes of thought (Kuhn, 1989). Having the capacity for logical thought, then, does not ensure that it will actually occur.

Conservation: *Principle stating that certain physical attributes of an object remain unchanged even though its outward appearance changes.*

Concrete Operations: *In Piaget's theory, a stage of cognitive development occurring roughly between the ages of seven and eleven. It is at this stage that children grasp such principles as conservation and the capacity for logical thought emerges.*

Formal Operations: *In Piaget's theory, the final stage of cognitive development, during which individuals may acquire the capacity for deductive or propositional reasoning.*

Hypothetico-Deductive Reasoning: *In Piaget's theory, a type of reasoning first shown during the stage of formal operations. It involves formulating a general theory and deducing specific hypotheses from it.*

Propositional Reasoning: *In Piaget's theory, reasoning during the stage of formal operations, in which individuals can assess the validity of verbal assertions even when these refer to possibilities rather than to actual events.*

PIAGET'S THEORY: A Modern Assessment

All theories in psychology are subject to rigorous scientific scrutiny. But grand theories such as Piaget's seem to cry out for especially careful assessment of their sweeping assertions. It is not surprising to learn, therefore, that Piaget's views have been the focus of a large number of investigations

designed to test their accuracy (Flavell, 1982). The results of such research suggest that the theory, although insightful in many respects, definitely does *not* provide a completely accurate account of cognitive development. In particular, existing evidence suggests that Piaget's theory is incorrect—or at least requires major revision—with respect to three issues: (1) the age at which infants and preschoolers achieve many milestones of cognitive development, (2) the discreteness of stages of cognitive development, and (3) the importance of language and social interactions with caregivers in cognitive growth.

The Case of the Competent Preschooler With respect to the first of these issues, a large body of evidence indicates that Piaget seriously underestimated the cognitive abilities of infants and young children. For example, even infants 4.5 months of age seem to possess a basic grasp of object permanence (Baillargeon, 1987). Similarly, children as young as three show some understanding of the concept of *conservation*—the fact that certain physical attributes of an object can remain unchanged even though the outward appearance of the object is altered (Cuneo, 1980). In these and several other ways, Piaget seems to have underestimated the cognitive abilities of young children.

The Social Context of Cognitive Development

According to Vygotsky (1987), children often learn in situations in which parents present them with cognitive tasks that are slightly too difficult for them to perform alone. The social interaction and dialogue that occur in such situations help children master new skills.

Discrete Stages in Cognitive Development: Myth or Reality? Piaget proposed that cognitive development passes through discrete stages and that these are *discontinuous*: Children must complete one stage before entering another. Most research findings, however, indicate that cognitive changes occur in a *gradual* manner. Rarely does an ability entirely absent at one age appear suddenly at another. So many developmental psychologists disagree with this basic aspect of Piaget's thought.

Language and the Social Context of Cognitive Development Young children often talk to themselves as they go about their daily activities, giving themselves instructions about what to do next. Piaget called this *egocentric speech* and suggested that it was a sign of children's cognitive immaturity and inability to take account of the perspective of others. Thus, he downplayed the importance of such speech in cognitive development. The Soviet psychologist Vygotsky (1987) objected strongly to these beliefs, contending that **private speech**, as he termed it, is not egocentric. On the contrary, it occurs when young children encounter obstacles or difficulties and represents their efforts to engage in self-guidance. Vygotsky felt that this early use of language helps young children reflect on their behavior and so plays a key role in cognitive development. The results of many studies tend to confirm these views (e.g., Bivens & Berk, 1990). Moreover, research also provides support for Vygotsky's contention that social communication with caregivers plays a key role in cognitive growth. For example, the following exchange took place between my daughter and me years ago, as she worked on a jigsaw puzzle:

Private Speech: *The instructions about what to do next that young children often give themselves as they perform various activities.*

JESSICA: I can't get this one in. *(Tries to put piece in wrong place.)*
FATHER: What piece might go up there?
JESSICA: His hat. *(Looks for piece with hat on it but selects wrong one.)*
FATHER: What piece looks like this opening? *(Points to top of puzzle.)*

JESSICA: This blue one. *(Tries it and it fits.)*

FATHER: Now, what might go here, at the bottom?

Vygotsky believes cognitive development is enhanced by such interactions, and again, research findings offer support for this view. For example, it has been found that children whose parents encourage them in this way use more private speech when working alone (Behrend, Rosengren, & Perlmutter, 1988), and that those who do so are also more successful when working alone (Behrend, Rosengren, & Perlmutter, 1992). Of course, verbal communication is not the only means through which children's thinking develops. However, it does seem to play a more important role than Piaget believed, so Vygotsky's views pose another serious challenge to Piaget's theory.

In sum, there is now general agreement among developmental psychologists that in certain respects, Piaget's theory is inaccurate. It gives too little credit to the cognitive abilities of infants and young children, it overemphasizes the importance of discrete stages, and it underestimates the role of private speech and social interaction with caregivers. Despite these problems, however, its impact has been—and remains—profound. Piaget's theory has greatly altered our conception of the way children think and reason and has served as a major framework for research on cognitive development.

KEY POINTS

- According to Piaget, young children move through a series of discrete stages of cognitive development.
- In the sensorimotor stage, infants acquire basic understanding of the links between their own behavior and the effects it produces; however, they lack the idea of object permanence.
- In the preoperational stage, babies can form mental representations of the external world. However, they show egocentrism in their thinking.
- In the concrete operations stage, logical thought emerges.
- Finally, in the stage of formal operations, older children and adolescents can think logically, manipulate abstract concepts and ideas in their minds, and engage in propositional reasoning.
- Challenges to Piaget's theory have asserted: Young children attain key cognitive milestones at much younger ages than Piaget suggested; children generally do not seem to pass through discrete and discontinuous stages of cognitive development; and Piaget underestimated the importance of language and social interactions.

COGNITIVE DEVELOPMENT: An Information-Processing Perspective

Whatever the ultimate fate of Piaget's theory, there can be no doubt that he is a giant figure in the study of human development and that his views remain influential even today. During the past twenty years, however, an alternative approach to understanding cognitive development has emerged and has gained increasing support among psychologists. Generally known as the *information-processing approach* (see chapter 6), this view suggests that the human mind is best understood as an active information-processing system. Psychologists who adopt this approach seek to understand how children's capacities to process, store, retrieve, and actively manipulate information increase with age (Case, 1991). Because the information-processing approach is supported by a rapidly growing body of scientific evidence, and because it is fully consistent with the growing emphasis on cognitive processes in all of modern psychology, it merits our careful attention.

SENSORY PROCESSING: EFFICIENCIES IN PERCEIVING THE EXTERNAL WORLD

Earlier in this chapter, I noted that even newborns possess considerable ability to perceive the world around them. As you can readily guess, however, children's skills in this respect improve rapidly over the years. The information-processing approach suggests that such improvements include increasing ability to notice fine-grained and subtle features of the external world—for example, not just the difference between a human face and a jumbled pattern, but the differences between individual faces.

In addition, cognitive growth involves the development of increasingly sophisticated cognitive frameworks, or *schemas*, for interpreting new stimuli. That even newborns possess impressive abilities to form such frameworks is indicated by the findings of numerous studies (e.g., Langlois, Roggmann, & Reisser-Danner, 1990; Walton, Bower, & Bower, 1992).

For example, consider an investigation performed by Walton and Bower (1993). In this study, infants only a few hours old (eight to seventy-eight hours) were placed in a situation in which, by sucking on a pacifier, they could cause color images of women's faces to appear on a screen in front of them. Each face remained on the screen as long as the infant sucked on the pacifier. Whenever a participant stopped sucking for a second, however, another face was shown. There were six different faces, shown one at a time. The first four were of individual women (two blondes and two brunettes). The fifth face was a *composite* constructed from the four already shown, while the sixth was another composite, constructed from faces the babies had not seen before. Walton and Bower (1993) reasoned that if the infants formed a cognitive representation of the faces they saw (a *prototype*), then they would look longer at the first composite face, which was based on faces they had seen and so resembled this prototype, than at the second composite face, which was based on faces they had *not* seen. Results of the study indicated that this is precisely what happened.

These findings, and those of related studies, indicate that even newborns can readily form mental representations of the stimuli to which they are exposed, and do so very rapidly (in this study, in less than a minute). Of course, as we grow older, our ability to form increasingly complex representations increases. And this growing ability, in turn, helps us to make increasing sense out of the complex world around us.

Attention: From Unfocused Scanning to Focused Planfulness If you've ever observed very young children, you know that they are readily distracted. In other words, they seem unable to focus their attention exclusively on whatever task they are currently performing. As children grow older, however, they acquire an increasing ability to concentrate. Thus, by the time they are about seven years old, they can learn to tune out such distractions as music or other background stimuli (e.g., Higgins & Turnure, 1984). Since our information-processing capacities are quite limited (refer to chapters 6 and 7), this growing ability to focus on the most important aspects of a given situation offers important advantages.

In addition, as they grow older, children acquire greater skills in *planfulness:* active decision making about where and how to direct their attention. In an especially revealing study on this aspect of cognitive development, children ages three to five walked one by one with an experimenter through a familiar playground (Wellman, Somerville, & Haake, 1979). With each child the researcher stopped at eight locations and at one (the third stop) took the child's picture. When they reached the seventh stop, however, the camera was missing, and the children were asked to search for it. Three-year-olds went to the location where the picture had been taken, but then often gave up. Older preschoolers, however, were more likely to start there, but then to search *all* of the locations in sequence. Thus, they showed evidence of planning with respect to their search. Later, children show even greater sophistication with respect to planfulness; by the time they are nine, for instance, they plan activities in detail, even searching for various kinds of shortcuts (Gauvain & Rogoff, 1989).

Unfortunately, not all children show such increasing ability to focus their attention. Please see the following **Point of It All** section for a discussion of the difficulties faced—and caused—by such youngsters.

The Point of It All

Attention-Deficit Hyperactivity Disorder: Kids Who Really Can't Sit Still

When you were in grade school, did you ever have any classmates who simply couldn't sit still—classmates who could not work quietly at their seats when other members of the class were doing so? Probably you did, because it is estimated from 3 to 5 percent of all school-age children suffer from **attention-deficit hyperactivity disorder (ADHD)**. This disorder is four or five times as common among boys as girls, but regardless of gender, it produces the same effects: youngsters suffering from it are unable to concentrate their attention on any task for more than a few minutes. As a result, they quickly become bored in school and cause many problems for teachers, classmates, and themselves. They talk during quiet periods, ignore social rules, leave their seats, and generally create disturbance in the classroom. They always seem to be operating on high, and charge through each day with excessive energy. Their behavior leaves teachers frazzled and often leads to rejection by their classmates (Henker & Whalen, 1989).

ADHD children have normal intelligence, but they show deficits in their ability to focus their attention. They find it difficult to ignore irrelevant information (Landau, Milich, & Lorch, 1992) and do poorly on tests requiring sustained attention. What are the causes of this disorder? Heredity seems to play a role; identical twins are more likely to share this disorder than nonidentical twins, and adopted children with a hyperactive biological parent are more likely to show it than adopted children without such a parent (Alberts-Corush, Firestone, & Goodman, 1986). But ADHD also seems to be related to high levels of stress at home, and exposure of the children's mothers to prenatal teratogens such as alcohol and smoking seems to play a part.

ADHD can be effectively treated with medication. However, children with this disorder also benefit from therapy in which appropriate behavior is modeled for them (Barkley, 1990). Family intervention, too, is important. The unruly behavior of ADHD children often strains parents' patience to the breaking point, leading parents to treat the children in a punitive manner—which tends to increase rather than decrease the wild behavior. To conclude, there is definitely hope for ADHD children, but only if they receive appropriate treatment. And assuring that they receive it seems crucial: If left untreated, ADHD children often develop into hostile, impulsive adults.

Attention-Deficit Hyperactivity Disorder

Children with *attention-deficit hyperactivity disorder* cannot focus their attention on any task for more than a few minutes. As a result, they quickly become bored and often disrupt classroom activities.

Memory: Improving Strategies, Improving Performance Memory is a key aspect of cognition, so it is hardly surprising that it improves in many ways as children mature. With respect to short-term memory, a key change is the increasing use of various strategies for retaining information. As noted in chapter 6, *rehearsal* is perhaps the most important of these. As you might expect, five- and six-year-olds are much less likely than adults to repeat information to themselves as they try to memorize it. By the time children are eight years old, however, they do engage in simple forms of rehearsal. And when they are ten or eleven, they combine various items or pieces of information and rehearse these larger *chunks* of information (e.g., Kunzinger, 1985). Interestingly, even children as young as three show some sign of engaging in efforts to improve their own memories. When children of this age are given

Attention-Deficit Hyperactivity Disorder: *A psychological disorder in which children are unable to concentrate their attention on any task for more than a few minutes.*

familiar toys and asked to remember as many as possible, they play with the toys less and spend more time naming them than children not asked to remember (Baker-Ward, Ornstein, & Holden, 1984). Additional findings indicate that as they grow older, children also make increasing use of other techniques for retaining information in short-term memory, such as efforts to organize such information (e.g., Bjorklund & Muir, 1988).

With respect to long-term memory, it is clear that as children mature, they expand their knowledge base in many different ways. Many researchers now believe that a key aspect of cognitive development involves expansion of *domain-specific knowledge,* knowledge pertaining to specific areas of life and activity. As such domain-specific knowledge increases, new information relating to any given domain becomes more meaningful and familiar; as a result, it is processed more efficiently and enters more readily into long-term memory (e.g., Bjorklund, 1987).

Children also acquire increasingly sophisticated **scripts**, or mental representations of expected sequences of events, for various situations as they grow older. This helps them improve their *episodic memory*—memory of events in their own lives. Children as young as three years old can describe simple scripts for everyday activities. And recent findings indicate that even those who lack the verbal skills to describe sequences of events—children only one or two years old—can act out rudimentary scripts for various situations with toys (e.g., Bauer & Mandler, 1992). One of my own early scripts was for visits to the dentist. Because my mother suffered from a calcium deficiency, I had lots of problems with my baby teeth, so visiting the dentist was an all-too-common event in my life when I was only three years old. My script for such visits ran something like "Horrible pain in a big, cold chair." You can imagine how eager I was to follow this script to completion!

As they grow older, children's scripts become more complete and more sophisticated, with the result that their memory for everyday events also improves. So in a sense, improving memory throughout childhood reflects children's increasingly sophisticated strategies for retaining information in memory coupled with a growing knowledge base and all the benefits this confers.

Metacognition: Thinking about—and Understanding—Thinking

Another important aspect of cognitive development that fits very well with the information-processing approach involves **metacognition**: awareness and understanding of our own cognitive processes. Cognitive psychologists believe that in order to operate most effectively, cognitive systems such as our minds must be aware of themselves. They must be able to generate such thoughts as "I'd better read this paragraph again; I didn't understand it the first time," or "I'd better make a note of that information—it seems important, and I may want to use it later." Clearly, young children lack such insights in comparison to older children and adults. Yet they are not totally lacking where metacognition is concerned. Three-year-olds understand that thinking about other things can hinder their performance on a task (Miller & Zalenski, 1982). And by the time they are four or five, most children realize that other people can hold false beliefs (Harris, 1991) and that their own memories are limited (Miller & Zalenski, 1982).

Script: *Mental representation of the sequence of events in a given situation.*

Metacognition: *Awareness and understanding of our own cognitive processes.*

Gradually, as they develop increasing understanding of how their own minds operate, children acquire new and more sophisticated strategies for maximizing their own efficiency. They combine various strategies for enhancing attention and memory, monitor their progress toward chosen goals, and examine their understanding of information and feedback as it is received. In short, they become increasingly capable of *self-regulation* with respect to their cognitive processes as well as other aspects of their behavior.

COGNITIVE VARIABILITY AND COGNITIVE DEVELOPMENT That cognitive development takes place is obvious: All of the changes we have discussed with respect to attention, memory, and metacognition point to the rapidity and scope of such change. But how, precisely, does it occur? In the past, this basic issue received surprisingly little attention (Siegler, 1994). Researchers focused more on determining *when* various changes in cognition occur than on determining *how* such change takes place. Recently, however, developmental psychologists have shown growing interest in this important issue (Siegler & Crowley, in press). The results of their investigations point to the tentative conclusion that one important mechanism behind cognitive growth is a high degree of *variability* in children's thinking. Such variability often increases just before children discover new strategies for solving certain types of problems or new ways of thinking about the world (Siegler & Jenkins, 1989). Moreover, children who show high degrees of variability in their thinking tend to be more likely to demonstrate such progress than those who do not (e.g., Graham & Perry, 1993).

How does increased variability in thinking contribute to cognitive development? Perhaps by allowing us to discover what works and what doesn't work in a given context. As one noted expert puts it (Siegler, 1994, p. 4): "Variability of cognition and action allows us to discover a great deal about the environments toward which the thinking and action are directed. . . ." In other words, cognitive variability facilitates learning at a time of life when we are "universal novices"—beginners with respect to many tasks. It is at this time, especially, that we can profit from variability in thinking, and such variability is indeed present during the early years of life. Of course, other mechanisms may also play important roles in cognitive growth. However, focusing on the high levels of variability in young children's thought may well advance our knowledge of a key question: How does such development actually take place?

To conclude: the information-processing perspective suggests that cognitive development can best be understood in terms of improvements in basic aspects of information processing—improvements in the manner in which we perceive, attend to, memorize, retrieve, and manipulate information. This is a very different view of cognitive development from that proposed by Piaget. However, it is, in important respects, closer to the core of modern psychology and has already added significantly to our understanding of this important process. Thus, it seems reasonable to predict that the information-processing approach will continue in the years ahead to serve as an important guide to research on how we come to understand the world around us. (See the **Key Concept** feature on page 314 for a comparison of the two important views of cognitive development.)

KEY POINTS

- According to the information-processing perspective, cognitive development involves the increasing ability actively to process, store, retrieve, and manipulate information.
- Infants can form prototypes—mental representations of external stimuli—within hours of birth. They rapidly acquire the ability to notice increasingly fine-grained features of the external world.
- Babies' ability to focus their attention on tasks they are performing increases rapidly, as does *planfulness*—the capacity to decide actively where and how to direct attention.
- As they grow older, children acquire increasingly sophisticated strategies for enhancing their memory and expand their domain-specific knowledge.
- They also acquire increasingly sophisticated understanding of their own cognitive processes—metacognition.

MORAL DEVELOPMENT: Reasoning about "Right" and "Wrong"

Is it ever right to cheat on an exam? What about cheating on your income taxes? Would it ever be right to lie to another person—for example, to tell someone that you like her new hair style when you really hate it? Is it okay to remove the pollution-control system from your car in order to improve its gas

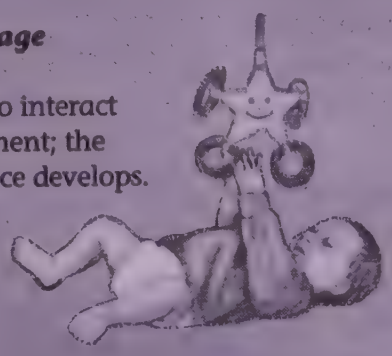
Key Concept

Two Views of Cognitive Development

Piaget's Theory

- There is tension between these drives: assimilation and accommodation.
- Cognitive development is an invariant movement through a fixed order of *stages.*
- New cognitive abilities appear at each stage.

Sensorimotor Stage
0–2
The child begins to interact with the environment; the idea of permanence develops.



Preoperational Stage
2–6 or 7
The child begins to represent the world symbolically.

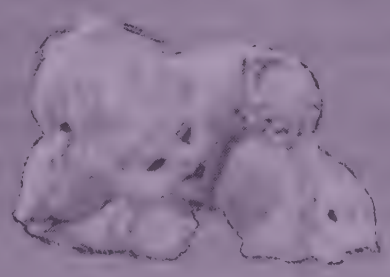
Concrete Operations Stage
7–11 or 12
The child learns to appreciate such principles as conservation; logical thought emerges.

Formal Operations Stage
12–adulthood
The adolescent becomes capable of logical thought.

Information-Processing Perspective

- Children's capacities to process information increase with age.
- Neither the rate nor the order of these changes is invariant.
- Improvements occur with respect to each capacity.

Sensory Processing
The child gains in ability to notice subtle features of the external world.



Attention
Children's ability to focus attention and make plans increases with age.

Memory
Children acquire increasing capacity plus more sophisticated techniques for enhancing memory.

Metacognition
As children grow, their capacity to regulate their own cognitive processes increases.

mileage? As adults, we often ponder such *moral questions*—issues concerning what is right and what is wrong in a given context. And as adults, we realize that such matters are often complex: Whether a given action is acceptable or unacceptable may depend on many factors, including the specific circumstances involved, legal considerations, and our own personal code of ethics.

But how do children deal with such issues? They, too, must make moral judgments. Is their reasoning about such matters similar to that of adults? This is the key question addressed in research on **moral development**—changes in the ability to reason about what is right and what is wrong in a given situation (Vitz, 1990). While many different views concerning moral development have been proposed, the most influential is a theory offered by Lawrence Kohlberg (1984). Let's consider Kohlberg's theory, and some of the evidence relating to it, in some detail.

KOHLBERG'S STAGES OF MORAL UNDERSTANDING Building on earlier views proposed by Piaget (1932/1965), Kohlberg studied boys and men and suggested that human beings move through three distinct levels of moral reasoning, each divided into two separate phases. In order to determine the stage of moral development participants had reached, Kohlberg asked them to consider imaginary *moral dilemmas*, situations in which competing courses of action were possible. Participants then indicated the course of action they would choose, and explained why. According to Kohlberg, it is the explanations, *not* the decisions themselves, that are crucial, for it is the reasoning displayed in these explanations that reveals individuals' stage of moral development. One such dilemma is as follows:

> A man's wife is ill with a special kind of cancer. There is a drug that may save her, but it is very expensive. The pharmacist who discovered this medicine will sell it for $2,000, but the man has only $1,000. He asks the pharmacist to let him pay part of the cost now and the rest later, but he pharmacist refuses. Being desperate, the man steals the drug. Should he have done so? Why?

Let's consider each of the levels of moral development described by Kohlberg and the kind of reasoning he feels would be indicative of it.

The preconventional level. At the first level of moral development, which Kohlberg terms the **preconventional level**, children judge morality largely in terms of consequences: Actions that lead to rewards are perceived as good or acceptable; ones that lead to punishments are seen as bad or unacceptable. Within the preconventional level, Kohlberg describes two distinct phases. At Stage 1, known as the *punishment-and-obedience orientation*, children cannot grasp the existence of two points of view in a moral dilemma. As a result, they unquestioningly accept an authority's perspective as their own and view deferring to such authority as the basis for behaving morally. For example, a child at this stage might state, "The man should steal the drug because if he lets his wife die, he'll get in trouble. He'll be blamed for not spending the money to help her."

At Stage 2, known as the *naive hedonistic orientation*, children are aware of the fact that people can have different points of view in a moral dilemma. Thus, they judge morality in terms of what satisfies their own needs or what satisfies the needs of others. A child at Stage 2 might say, "The man shouldn't steal the drug unless he's so crazy about his wife that he can't live without her. He's running a big risk in stealing the drug."

The conventional level. As children's cognitive abilities increase, Kohlberg reasons, children enter a second level of moral development, the **conven-**

Moral Development: *Changes in the capacity to reason about actions' rightness or wrongness that occur with age.*

Preconventional Level *(of morality): According to Kohlberg, the earliest stage of moral development, in which individuals judge morality in terms of the effects produced by various actions.*

tional level. Now they are aware of some of the complexities of the social order and judge morality in terms of what supports and preserves the laws and rules of their society. This level, too, is divided by Kohlberg into two distinct stages. In Stage 3, known as the *good boy–good girl orientation*, people judge morality in terms of adhering to social rules or norms, but only with respect to people they know personally. They want the approval of such persons and seek it by judging morality in terms of adherence to norms or rules accepted by these persons. Thus, a child at this stage might state, "It's OK to steal the drug, because no one will think you are bad if you do. If you don't and let your wife die, you'll never be able to look anyone in the face again."

In Stage 4, known as the *social-order-maintaining orientation*, people can extend judgments of morality to include the perspective of third persons, not just that of themselves and people they know. Moreover, they can make such judgments for all individuals, not just for ones with whom they are acquainted. Thus, they feel that laws must be applied equally to all, not only to friends or relatives. For example, in the drug-stealing example, a child at Stage 4 who argues for stealing the drug might state, "The man should steal the drug, since he took a marriage vow to stand by his wife. It's wrong to steal, so he should expect to pay for this action." Similarly, a child who argues against stealing the drug might say, "It's natural for the man to want to save his wife, but it's wrong to steal. Even if his wife is dying, that's no excuse for stealing and breaking the law. If everyone did this, society couldn't exist."

The postconventional level. Finally, in adolescence or early adulthood, many—though by no means all—individuals enter a third level known as the **postconventional level,** or principled level. At this stage people judge morality in terms of abstract principles and values, rather than in terms of existing laws or rules of society. Again, Kohlberg suggests that there are two stages within the postconventional level. At Stage 5, known as the *social contract/legalistic orientation*, individuals are aware of the fact that any single rule system is only one of many possibilities and can envision alternatives to the existing social order. Thus, they realize that laws can sometimes be inconsistent with the rights of individuals or the interests of the majority; such laws should be changed. Individuals at this stage of moral development might reason as follows: "Although it is against the law to steal, stealing the drug is justified. By doing so he saves his wife's life, and life is more important than property." Or if they argue for not stealing the drug, they might state, "There is a law against stealing, and it represents the will of the majority—how people have decided to live together in society. By living in that society, the man agrees to maintain its laws, so stealing the drug is a violation of this agreement."

Finally, in Stage 6, known as the *universal ethical principle orientation*, individuals judge the morality of actions in terms of self-chosen ethical principles. Persons who attain this highest level of moral development believe that certain obligations and values transcend the laws of society at any given point in time. The rules they follow are abstract and ethical, not concrete like the Ten Commandments, and they are based on inner conscience rather than external sources of authority. Individuals at Stage 6 might argue for stealing the drug as follows: "If the man doesn't steal the drug, he is putting property above human life; this makes no sense. People could live together without private property, but a respect for human life is essential." In contrast, if they argue for not stealing the drug, they might state: "If the man stole the drug he wouldn't be blamed by others, but he would probably blame himself, since he has violated his own standards of honesty and has furthered his own needs at the expense of another person." An overview of the stages described by Kohlberg is provided in Table 8.1.

Conventional Level *(of morality): According to Kohlberg, a stage of moral development during which individuals judge morality largely in terms of existing social norms or rules.*

Postconventional Level *(of morality): According to Kohlberg, the final stage of moral development, in which individuals judge morality in terms of abstract principles.*

Level/Stage	Description
Preconventional Level	
Stage 1: Punishment-and-obedience orientation	Morality judged in terms of consequences.
Stage 2: Naive hedonistic orientation	Morality judged in terms of what satisfies own needs or those of others.
Conventional Level	
Stage 3: Good boy—good girl orientation	Morality judged in terms of adherence to social rules or norms with respect to personal acquaintances.
Stage 4: Social-order-maintaining orientation	Morality judged in terms of social rules or laws applied universally, not just to acquaintances.
Postconventional Level	
Stage 5: Legalistic orientation	Morality judged in terms of human rights, which may transcend laws.
Stage 6: Universal ethical principle orientation	Morality judged in terms of self-chosen ethical principles.

Table 8.1

Kohlberg's Theory of Moral Development: A Summary

According to Kohlberg, we move through three distinct levels of moral development.

Evidence Concerning Kohlberg's Theory Do we really pass through the series of stages described by Kohlberg, becoming increasingly sophisticated in our judgments of morality? While not all evidence is consistent with Kohlberg's theory, many studies do support at least its broad outlines. A review of many cross-sectional studies with a total of more than 6,000 participants, indicated that moral maturity, as measured by Kohlberg's system, does increase with age (Rest, 1986). Several longitudinal studies also point to the conclusion that as people grow older, increasing percentages of them enter higher levels of moral development (e.g., Colby et al., 1983). Interestingly, in several of these studies, no participants achieved Stage 6 reasoning. This led Kohlberg to conclude that Stage 6 should be eliminated from the theory: It seems to demand a level of sophistication with respect to moral reasoning that few human beings ever achieve.

Existing evidence suggests, then, that moral reasoning does often increase in complexity with age, and that in many cultures, many persons do move through the stages described by Kohlberg. However, such progress is more variable and less universal than Kohlberg assumed. In addition, moral reasoning is strongly affected by a number of environmental factors, such as amount of formal education (Rest & Thomas, 1985), parents' child-rearing practices (Walker & Taylor, 1991), and culture. For information on the effects of culture, please see the **Perspectives on Diversity** section below.

Perspectives on Diversity

Moral Development: Universal or Culture-Related?

In technologically advanced cultures, as described above, longitudinal research indicates that many individuals do seem to move through the stages outlined by Kohlberg. But what about other cultures? Is the same pro-

CULTURAL INFLUENCES ON MORAL DEVELOPMENT

Children raised on Israeli kibbutzim, where a sense of community is emphasized, score higher on moral development than U.S. children of the same ages. What underlying reasons might help explain this difference?

gression apparent? Growing evidence indicates that it is not. For example, in isolated peasant and tribal communities few if any people reach Stage 4 (Boyes & Walker, 1988). This finding does not seem to reflect communication problems, because even in these cultures research participants understand the dilemmas presented to them and view the issues raised as important and familiar (Walker, 1988). Rather, the absence of Stage 4 and higher reasoning seems to be related to the absence of contact with formalized systems of government, law, and ethics. Experience with such systems seems to be needed for emergence of the highest stages of moral reasoning.

Evidence for these conclusions is provided by comparisons between American children and kibbutz-reared Israeli children (Fuchs et al., 1986). Because children on kibbutzim are raised in an environment where they participate regularly in the cooperative institutions of their society, it might be expected that they would score higher in moral development than Americans of comparable age. In fact, this is what has been observed. Kibbutz-raised children score higher on moral development than Americans from age thirteen on, and a higher proportion eventually reach Stage 5.

Do these findings mean that Kohlberg's theory is applicable only to Western societies, with their emphasis on institutionalized moral values and individual rights? One way to find out would be to examine the development of moral reasoning in societies that are as complex as Western ones but that accept contrasting philosophical traditions—ones emphasizing a collectivistic orientation and collective solutions to individual problems.

One such society that has been studied in this respect is India (Vasudev & Hummel, 1987). In this research, moral-reasoning interviews were conducted with urban middle-class and upper middle-class people ranging in age from eleven to over fifty. The religions of participants included Hindu, Jain, and Sikh—religions emphasizing as basic moral values nonviolence and the interrelatedness of all forms of life. Results indicated that, consistent with previous research, stage of moral development did increase with age. Indeed, about 20 percent of adults gave postconventional responses. These findings suggest that Kohlberg's theory applies to cultures other than Western ones. However, additional findings indicated that cultural factors did play an important role in shaping participants' responses. Specifically, Indian cultural traditions tended to emphasize collective solutions to the moral dilemma, rather than appeals to private conscience. Thus, many participants were reluctant to select a solution to the problem of the man and the drug. Instead, they suggested, the solution should be worked out in terms of the needs of the entire society, not of a single individual. Similar comments have also been obtained with Israeli and Chinese participants (Hwang, 1986).

What do these findings mean? One interpretation is that Kohlberg's theory does indeed tap universal dimensions of moral reasoning—dimensions that exist in all cultures. However, such reasoning occurs in a cultural context and cannot be entirely separated from it. What is viewed as "right" in one culture may be viewed as "wrong" in another, and vice versa, even if the people in both groups recognize the same complexities and issues in a given situation. Where morality is concerned, then, we must consider not only universal principles but important culture-based factors as well.

Sex Differences in Moral Development: Is Kohlberg's Theory Sex-Biased? Perhaps the most controversial aspect of Kohlberg's theory is the finding, reported in several studies, that females lag behind males in terms of Kohlberg's stages of moral reasoning. Specifically, some studies reported that girls attain Stage 3 but then progress no further, while boys move on to Stages 4, 5, and 6 (Holstein, 1976). These findings were interpreted by some researchers as consistent with the view that women's morality is based on concerns for interpersonal approval and maintaining positive relationships, while men's morality rests primarily on abstract principles.

In response to such findings, Gilligan (1982) suggested that Kohlberg's theory was sex-biased. She pointed out that Kohlberg did not include females in his original research. Gilligan argued, moreover, that within Kohlberg's theory, morality is judged solely in terms of the ability to reason abstractly about moral dilemmas. In this respect, it overlooks another vital basis for moral judgments: *concern for others*. Gilligan proposed that females may move through several stages of moral development based on this factor. Thus, at first they make moral judgments in terms of concrete commitments to specific people (Stage 3). Later they shift to an abstract understanding of care as a universal obligation—a form of postconventional reasoning. Thus, Gilligan proposed that males and females are equal in terms of the complexity of their moral reasoning; they merely emphasize different aspects of this process.

Was Gilligan correct? Does Kohlberg's theory underestimate the moral maturity of females? Most studies undertaken to test this assertion do not support it. On both hypothetical dilemmas and everyday moral problems, females score as high as males in Kohlberg's terms (Walker & DeVries, 1985). Indeed, if anything, females tend to score *higher* in moral reasoning than males. Moreover, when asked to recall personal moral conflicts they have actually experienced, males and females of various ages do not differ as to whether they describe these in terms of concerns for impersonal rights or in terms of caring for others and personal relationships (Walker, 1988). Thus, there is little evidence for the view that the two sexes focus on different aspects of moral dilemmas.

Despite these findings, Gilligan's concerns about Kohlberg's theory have yielded an important benefit: They call attention to the fact that evaluating moral development solely in terms of rights and justice is not enough; in addition, concern for the welfare of others must be taken into account (Galotti, Kozberg, & Farmer, 1991).

Key Points

- Kohlberg's theory of moral development suggests that all human beings move through a series of stages of moral reasoning: preconventional, conventional, and postconventional.
- Longitudinal research indicates that level of moral reasoning does increase with age. However, environmental factors such as level of education, parents' child-rearing practices, and cultural traditions influence its development.
- Contrary to initial findings, there is no evidence that males and females attain different levels of moral development.

Social and Emotional Development: Forming Relationships with Others

Cognitive development is a crucial aspect of human growth; yet it does not occur in a social vacuum. As infants and children are acquiring the capacities to think, reason, and use language, they are also gaining the basic experiences, skills, and emotions that permit them to form close relationships and interact with others effectively in many settings. How does such *social and emotional development* occur? What are some of its crucial milestones? We'll focus next on

these and related questions. (We'll consider aspects of *personality development*, especially an influential theory proposed by Erikson, in chapter 9.)

Emotional Development and Temperament

At what age do infants begin to experience and demonstrate discrete emotions? They can't describe their subjective feelings, of course, so efforts to answer these questions have focused primarily on discrete *facial expressions*—outward signs of distinct emotions. Research on emotional development has documented that such expressions appear within the first few months of life (Izard, 1992). Infants as young as two months old demonstrate *social smiling* in response to human faces. They show laughter by the time they are three or four months old (Sroufe & Waters, 1976). And other emotions, such as anger, sadness, and surprise, also appear quite early and are readily recognizable to adults.

Interestingly, some expressions appear before others, or at least are more common at early ages. For example, following medical inoculations, two-month-old infants show pain expressions more frequently than anger expressions (Izard, Hembree, & Huebner, 1987). A few months later, however, they show anger expressions more often than pain, and this difference increases during the next year. These findings, and many others, underscore an important point: *Emotional development and cognitive development occur simultaneously, and there are many connections between them.* That is, the finding that anger expressions in response to painful experiences become increasingly common during the first eighteen months of life can be interpreted as reflecting infants' growing ability to understand who or what has caused their discomfort. Before the age of seven months, infants cannot accomplish this task, but after this age, they can. Thus, the sharp rise in anger expressions.

As they grow older, babies also acquire increasing capacities to "read" the emotional expressions of others. At three months of age, they become upset when their mothers show an immobile facial expression (Tronick, 1989). By eight or ten months of age, they actively seek information about other people's feelings and begin to demonstrate **social referencing**—using others' reactions to appraise uncertain situations. Thus, after a fall, a one-year-old infant will look at its caregivers and, depending on *their* reactions, will cry or merely continue whatever it was doing (Walden & Ogan, 1988).

Finally, children also grow in ability to regulate their own emotional reactions. Infants have very little capacity to regulate their own emotions, but preschoolers engage in active efforts to understand and control their own internal states. For example, they may cover their eyes or ears to avoid exposure to stimuli they find disturbing, and they may talk to themselves to reduce anxiety ("Mommy said she'd be right back"). Such abilities increase throughout the grade-school years. By the time they are ten, most children can engage in fairly sophisticated strategies for regulating their own emotions; for example, lowering their expectations in order to minimize the threat of failure (Altshuler & Ruble, 1989).

As they grow older, then, children increase in ability to express emotions, regulate them, and recognize the emotions of others. These important changes play a key role in children's increasingly complex social relations.

Social Referencing: *Using others' reactions to appraise an uncertain situation or experience.*

Temperament: *Stable individual differences in the quality and intensity of emotional reactions.*

Temperament: Individual Differences in Emotional "Style" Do you know anyone who is almost always cheerful and upbeat—a true optimist? And what about the other extreme—someone who is reserved and usually irritable and gloomy? Psychologists refer to such stable individual differences in the quality and intensity of emotional reactions as **temperament**. Growing

evidence suggests that these differences are present very early in life—perhaps at birth (e.g., Kagan & Snidman, 1991). In fact, systematic research suggests that infants can be divided into three basic categories by temperament (Thomas & Chess, 1977). The first category, about 40 percent of infants, is described as *easy children*. They quickly establish regular routines in infancy, are generally cheerful, and adapt easily to new experiences. About 10 percent are *difficult children*. They are irregular in daily routines, are slow to accept new situations or experiences, and show many negative reactions, such as crying more than other infants. Finally, about 15 percent can be described as *slow-to-warm-up children*. They are relatively inactive and apathetic and show mild negative reactions to many new situations or experiences. The remaining 35 percent of infants cannot be readily classified under one of these headings.

How stable are such differences in temperament? Research findings present a mixed picture. On the one hand, several studies indicate that some aspects of temperament—attentiveness, activity level, and irritability—are quite stable (Ruff et al., 1990). For example, in one study (Kagan, Snidman, & Arcus, 1992), researchers tested several hundred infants when they were four months old and, on the basis of these tests, classified the babies as being *high-reactive* or *low-reactive*. High-reactive infants showed fretting, crying, and a high level of motor activity when exposed to unfamiliar events (tape-recorded human voices, unpleasant tastes, moving mobiles). In contrast, low-reactive infants showed low motor activity and minimal crying to the same events. The researchers tested both groups again when they were fourteen months old by observing their reactions as they encountered unfamiliar rooms, people, toys, and procedures (for example, placement of a blood pressure cuff on their arms, facial and vocal disapproval from the researcher, a request to test liquid from a dropper). Results indicated that 50 percent of the high-reactive children showed a high level of fear, while only 10 percent of the low-reactive infants did so (see Figure 8.4). Similar results were obtained when the children were tested again at twenty-one months of age. In related research (Kagan, Reznick, & Snidman, 1988), differences such as these have been found to remain stable into middle childhood.

Key Points

- Infants show a wide range of recognizable facial expressions.
- As they grow older, children acquire increasingly sophisticated abilities to "read" the emotions of others and to regulate their own emotions.
- Differences in temperament—consistent individual differences in the quality and intensity of emotions—are present very early in life; they are influenced by biological factors as well as environmental factors.

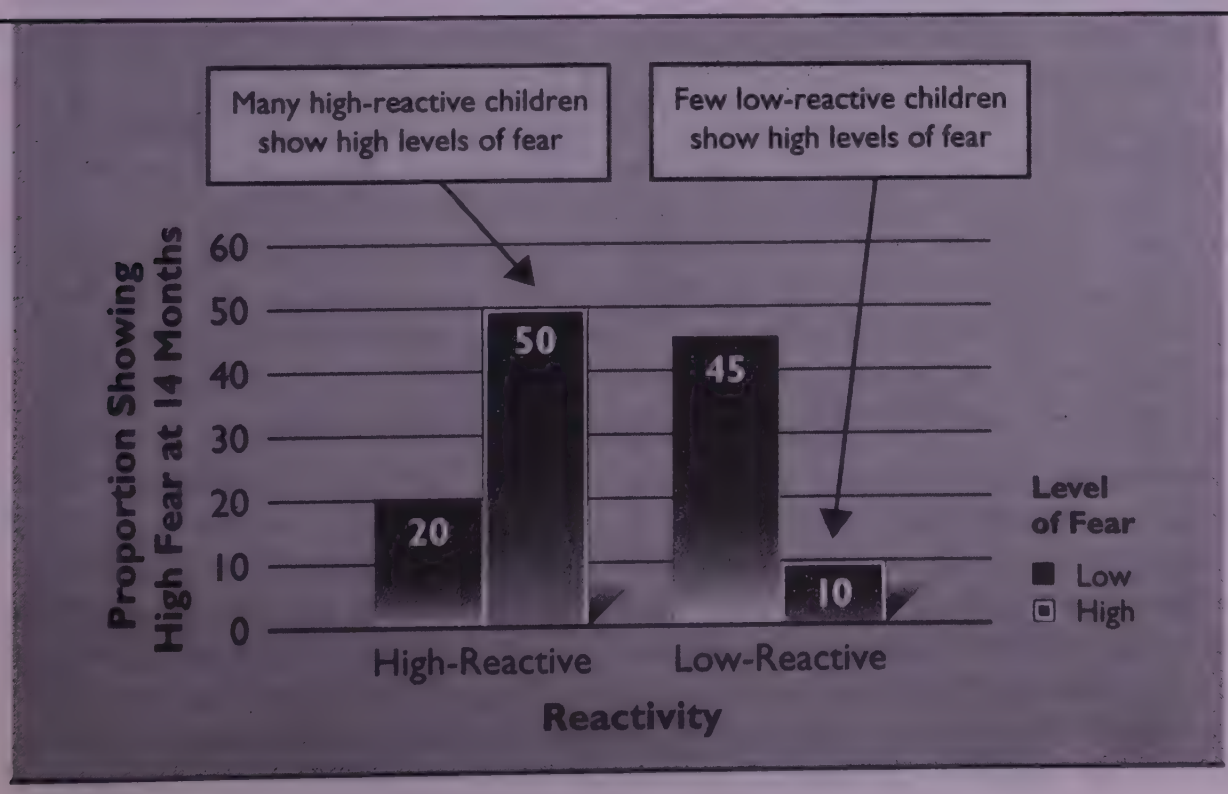


Figure 8.4

The Stability of Temperament

Four-month-old infants who showed fretting, crying, and a high level of motor activity when exposed to unfamiliar events (high-reactive infants) were much more likely than infants who did not fret or cry (low-reactive infants) to show a high level of fear when tested again in unfamiliar situations at fourteen months. These findings suggest that some aspects of temperament are quite stable over time. (*Source:* Based on data from Kagan, Snidman, & Arcus, 1992.)

On the other hand, other studies indicate that long-term stability in various aspects of temperament may occur only in persons who are relatively extreme on these dimensions (Kagan, Reznick, & Gibbons, 1989). So, although it may be influenced by genetic factors and tends to be quite stable, temperament does not seem to be etched in stone. Rather, it can be altered by experience and by external factors such as child-rearing practices (Otaki et al., 1986).

Whatever the relative contribution of genetic and environmental factors to temperament, individual differences in temperament have important implications for social development. For example, a much higher proportion of difficult than easy children experience behavioral problems later in life (Chess & Thomas, 1984). They find it more difficult to adjust to school, to form friendships, and to get along with others. In addition, many high-reactive children demonstrate *shyness* as they grow older and enter an increasingly broad range of social situations. This can be a serious problem for them and may adversely influence many aspects of later social development (Kagan, Reznick, & Snidman, 1988).

ATTACHMENT: *The Beginnings of Love*

Do infants love their parents? They can't say so directly, but by the time they are six or seven months old, most appear to have a strong emotional bond with the persons who care for them (Ainsworth, 1973; Lamb, 1977). Infants recognize their mothers, fathers, and other caregivers, smile at them more than at other persons, seek them out, and protest when separated from them. This strong affectional tie between infants and their caregivers is known as **attachment** and is, in an important sense, the first form of love we experience toward others.

What are the origins of this initial form of love? One explanation emphasizes the role of *learning*. Caregivers provide for infants' physical needs, so caregivers both offer and are associated with many forms of reward. Thus, both operant conditioning and classical conditioning may play a role in the formation of attachment. While these basic forms of learning probably do contribute to attachment, however, there are strong grounds for questioning the belief that they are its most important foundations. For example, attachment relationships, once they are formed, tend to persist over long periods, even when the persons to whom the bonds are formed are absent or no longer provide various forms of reinforcement (Ainsworth, 1969). Think about your own feelings of attachment to your mother or other loved ones; your bonds to these persons persist even if you have not seen them and have not been provided with reinforcements by them for many months.

An alternative view of attachment is suggested by **ethological theory**, first proposed by Bowlby (1969). According to this theory, infants are born with a set of behaviors that elicit parental care and so increase the infants' chances of survival. These attachment-facilitating behaviors include sucking, clinging, crying, smiling, gazing at the caregiver's face, and crawling after the caregiver (once the baby learns to crawl). As infants emit these behaviors, they elicit attention and caring behavior from adults. This, in turn, forms the foundation for the development of reciprocal bonds of attachment.

Attachment: *A strong affectional bond between infants and their caregivers.*

Ethological Theory *(of attachment): A theory suggesting that infants are born with a set of behaviors that elicit parental care and so increase the infants' chances of survival.*

MEASURING ATTACHMENT: REACTIONS TO THE STRANGE SITUATION TEST

How can the strength of attachment be measured? Mary Ainsworth and her colleagues (e.g., Ainsworth et al., 1978) devised an approach to this task in which researchers observe babies' behavior in situations where fear and distress are aroused. Presumably, children will seek comfort from their caregiver in this context; and the stronger their bonds of attachment, the greater the comfort they will derive from this person's presence—and the stronger their fear in his or her absence. To assess the strength of attachment, then, researchers

Episode	Persons Present	Duration	Events/Procedures
1	Mother and baby	30 seconds	Experimenter brings mother and baby to room; leaves
2	Mother and baby	3 minutes	Baby plays; mother seated
3	Mother, baby, stranger	3 minutes	Stranger enters; talks to mother
4	Stranger and baby	3 minutes (or less)	Mother leaves room; stranger remains; offers comfort to baby
5	Mother and baby	3 minutes (or more)	Mother returns, greets baby, offers comfort
6	Baby alone	3 minutes (or less)	Mother leaves room
7	Stranger and baby	3 minutes (or less)	Stranger enters room, offers comfort
8	Mother and baby	3 minutes	Mother returns; offers comfort

Table 8.2

Sequence of Events in the Strange Situation

The *strange situation* is used to study infants' attachment to their mothers. Researchers carefully study the infants' reactions to each of the events described here so as to determine the strength and nature of their attachment bonds to their mothers.
(*Source*: Adapted from Ainsworth et al., 1978.)

expose babies to the sequence of events shown in Table 8.2. These involve placing the mother and baby in an unfamiliar room, entry of a stranger into the room, departure by the mother, return of the mother, and so on. As each event occurs, babies' reactions are carefully observed. Do they cry when the mother leaves? How do they react when she returns? Do they appear more confident in her presence, despite the presence of a stranger? These are the kind of questions considered. (I say "mother" because most research using this test has focused on mothers and their infants. However, the same procedures could, presumably, be used for fathers or other caregivers, too.)

This **strange situation test**, as it is often termed, is widely used to study attachment in young children, and results obtained with it suggest that most children show one of four different patterns of attachment to their caregiver. About 67 percent of American middle-class babies show **secure attachment**. They may or may not cry on separation from their mothers, but if they do, it is because of her absence; they take little comfort from the presence of a stranger. When she returns, they actively seek contact with her, and crying is reduced at once. About 20 percent show **avoidant attachment**. They don't cry when their mother leaves, and they react to the stranger in much the same way as to their mother. When the mother returns, they typically avoid her or are slow to greet her. About 10 percent of American middle-class babies show a different pattern known as **resistant attachment**. Before separation these infants seek contact with their mother. After she leaves and then returns, however, they are angry and push her away. And many continue to cry even after she picks them up and attempts to comfort them. Finally, about 5 percent of American middle-class infants show **disorganized attachment**, also called **disoriented attachment**. When reunited with their mothers, these babies show disorganized or even contradictory responses. They look away from the mother while being held by her or approach her with a lack of emotion. They show a dazed facial expression and often adopt odd, frozen postures after being comforted.

Such differences in pattern of attachment are of more than passing interest. Children showing these different patterns also differ in other respects as well. For example, those who are securely attached are more sociable, better at solving certain kinds of problems, and more flexible and persistent in many

Strange Situation Test: *A procedure for studying attachment in which mothers leave their children alone with a stranger for several minutes and then return.*

Secure Attachment: *A pattern of attachment in which infants actively seek contact with their mother and take comfort from her presence when they are reunited with her during the strange situation test.*

Avoidant Attachment: *A pattern of attachment in which infants don't cry when their mother leaves them alone during the strange situation test.*

Resistant Attachment: *A pattern of attachment in which infants reject their mother and refuse to be comforted by her after she leaves them alone during the strange situation test.*

Disorganized (or Disoriented) Attachment: *A pattern of attachment in which infants show contradictory reactions to their mother after being reunited with her during the strange situation test.*

situations than children who are avoidantly or insecurely attached (Pastor, 1981). Moreover, securely attached children seem to experience fewer behavioral problems during later childhood (Fagot & Kavanaugh, 1990). These patterns of attachment seem to persist, and they may even affect the nature and quality of the romantic relationships people form as adults (Simpson, 1990; Vormbrock, 1993.)

What factors determine the pattern of attachment shown by a child? Several seem to play a role. For example, children who experience *maternal deprivation*—separation from their mother due to being placed for adoption—do not form secure attachments to any caregiver, and may later experience a wide range of behavioral problems ranging from depression to an excessive desire for adult attention (e.g., Hodges & Tizard, 1989). *Quality of caregiving*, too, plays a role. When caregivers are sensitive to the needs and signals of children, infants are much more likely to form secure attachments to them than when caregivers are not (Isabella & Belsky, 1991). In contrast, avoidant infants tend to have mothers who are either intrusive or overstimulating—who act without waiting for signals from their infants.

What about infant day care? Does placing children in day-care centers interfere with their forming secure attachments to their parents? For information on this issue, please see the **Point of It All** section below.

The Point of It All

Is Day Care a Threat to Secure Attachment?

When I was a child, I remember going with my mother to the playground. She and dozens of other mothers sat and chatted while I and the other children climbed, swung, and played various games. In that long-vanished era, fathers worked outside the home while mothers remained with the children. Now, of course, the situation has changed radically. A large majority of mothers of young children work outside the home. The result? A large proportion of infants and toddlers spend their days in full-time day-care centers. Does being separated from their mothers and fathers prevent youngsters from forming secure attachments to them? Some findings suggest that this may be the case (Belsky & Braungart, 1991). For example, infants in day-care centers show slightly higher rates of insecure attachment in the "strange situation" than do infants raised at home (34 percent versus 29 percent). On the face of it, these findings seem to suggest that placing infants in day care may have potentially harmful consequences.

Yet the situation is not so simple. First, a large majority of the infants of working mothers *are* securely attached—more than two-thirds (Thompson, 1988). The fact that these infants form secure attachments despite the absence of their parents on most days suggests that day care, in and of itself, may not interfere with attachment. Second, the slightly higher rates of insecure attachment among infants in day care may stem from other factors, quite distinct from day care itself. The mothers of such children may be fatigued from full-time work and so find it difficult to interact with their children as frequently or vigorously as those who do not work outside the home. Perhaps it is this factor, not simply being placed in day care, that interferes with attachment.

Finally, much seems to hinge on the *quality* of the day care infants receive. In a day-care center with a large number of children and few adults, any one child is bound to be ignored much of the time. Attachment—and other aspects of development—may indeed suffer as a result. But in centers where children

receive high levels of social stimulation and attention from adults, negative effects may not occur. In fact, under these conditions, children may actually benefit from the care they receive.

In sum, existing evidence indicates that day care, in and of itself, is neither a definite plus nor a clear-cut minus where social development is concerned. What is more important is the quality of care children receive both at home and in day-care centers. Given half a chance, most infants will develop into happy, healthy children. It is our responsibility as adults to do everything we can to ensure that they get this opportunity.

Contact Comfort and Attachment: The Soft Touch of Love An additional factor that seems to play an important role in attachment is *close physical contact* between infants and their caregivers. In short, attachment rests partly on the hugging, cuddling, and caresses babies receive from adults. The research that first established this fact was conducted by Harry Harlow and his colleagues and is a classic in the history of psychology.

When Harlow began his research, infant attachment was the farthest thing from his mind. He was interested in testing the effects of brain damage on learning. Since he could not perform such experiments with humans, he chose to work with rhesus monkeys. In order to prevent baby monkeys from catching various diseases, Harlow raised them alone, away from their mothers. This practice led to a surprising observation. Many of the infants seemed to become quite attached to small scraps of cloth present in their cages. They would hold tightly to these "security blankets" and protest strongly when they were removed for cleaning. This led Harlow to wonder whether the babies actually needed contact with soft materials.

To find out, he built two artificial "mothers." One consisted of bare wire, while the other possessed a soft terrycloth cover. Conditions were then arranged so that the monkey babies could obtain milk only from the wire mother. According to the conditioning explanation of attachment, they should soon have developed a strong bond to this cold wire mother. After all, she was the source of all their nourishment. In fact, this was *not* what happened. The infants spent almost all of their time clinging tightly to the soft cloth-covered mother. Only when driven by pangs of hunger did they leave her to obtain milk from wire mother.

Additional and even more dramatic evidence that the infants formed a strong bond to the soft mothers was obtained in further research (Harlow & Harlow, 1966), in which monkey babies were exposed to various forms of rejection by their artificial mothers. Some of the mothers blew them away with strong jets of air; others contained metal spikes that suddenly appeared from inside the cloth covering and pushed the infants away. None of these actions had any lasting effects on the babies' attachment. They merely waited until these periods of rejection were over and then clung to their cloth mother as tightly as before.

On the basis of these and related findings, Harlow concluded that a monkey baby's attachment to its mother rests, at least in part, on her ability to satisfy its need for *contact comfort*—direct contact with soft objects. The satisfaction of other physical needs, such as that for food, is not enough.

Do such effects occur among human babies as well? Some studies seem to suggest that they may. For example, two- and three-year-old children placed in a strange room play for longer periods of time without becoming distressed when they have a security blanket present than when it is absent (Passman & Weisberg, 1975). In fact, they play almost as long as they do when their

Harlow's Studies of Attachment

Although the wire "mothers" used in Harlow's experiments provided the monkey babies with nourishment, the babies preferred the soft cloth "mothers," which provided contact comfort. What do these famous experiments demonstrate?

mother is in the room. These findings suggest that for blanket-attached children, the presence of this object provides the same kind of comfort and reassurance as that provided by their mothers. So human infants, too, may have a need for contact comfort, and the gentle hugs, caresses, and cuddling they obtain from their caregivers may play a role in the formation of attachment.

FATHERS AND ATTACHMENT Despite the fact that many mothers work at full-time jobs outside the home, most mothers are still the primary caregivers for their children. Yet there can be little doubt that infants form strong attachments to their fathers, too, even though they often spend less time with them than with their mothers. Careful study of patterns of parent-child interaction indicates that mothers spend more time providing physical care to their children, while fathers spend more time in playful interactions with them (Roopnarine et al., 1990). Further, mothers and fathers engage in different types of play with their offspring. While mothers provide toys, talk to infants, and initiate games such as peekaboo, fathers engage in more physical play, such as lifting, swinging, and bouncing their infants. These differences persist even when fathers are the primary caregivers; they still interact with their children in a more vigorously physical manner (Yogman, 1981).

Do fathers play a special role in children's development? A growing number of psychologists believe that they do. They suggest that fathers tend to discipline their children in accordance with established and specific rules, while mothers discipline them on a moment-by-moment basis. Also, fathers often worry more about future success, while mothers tend to worry more about the infant's welfare (Gibbs, 1993). Thus, children may acquire somewhat different skills and information from their two parents. As one psychologist puts it (Shapiro, 1993, p. 61): "Kids learn from their moms how to be aware of their emotional side. From dad, they learn how to live in society." Of course, these generalizations may not apply to all, or perhaps even to most, families. Yet there is growing concern in many quarters over the absence of fathers from a large number of families. In the United States, it is estimated that because of divorce, out-of-wedlock births, and other factors, as many as 50 percent of children will spend a significant portion of their childhood without a father in residence. What effects does this have on their development? Evidence on this issue is just beginning to emerge (Phares & Compas, 1992). Most experts agree on one point: Both mothers and fathers are important to infants, and, other factors being equal, the benefits of having two loving parents in residence rather than only one may be substantial.

KEY POINTS

- Infants quickly form a strong emotional bond with their caregivers; this is known as attachment.
- The strength of attachment is often measured by the "strange situation." Many factors, including maternal deprivation, family circumstances, and culture, influence the strength of attachment.
- Placing infants in day-care facilities does not necessarily interfere with the formation of secure attachment to parents.
- Contact comfort, close physical contact between infants and caregivers, also plays a role in the formation of attachment.

GENDER: *The Development of Gender Identity and Sex-Stereotyped Behavior*

Gender: *An individual's membership in one of the two sexes.*

From the moment that children are born, **gender**—the fact that they belong to one sex or the other—plays a crucial role in their lives. The first words spoken about newborns often refer to their sex. And from the instant that parents

hear a nurse or physician announce that "It's a girl" or "It's a boy," they begin to think about and behave toward their child in ways that differ depending on its sex. In this section we'll consider the important effects of gender on social development. First we'll examine several views of how children acquire **gender identity**—the understanding that they belong to one gender or the other. Next, we'll turn to **sex-stereotyped behavior**—how children acquire stereotyped beliefs and patterns of behavior that society associates with each sex.

Gender Identity: Some Contrasting Views

At what age does a child become aware of being a girl or a boy—of belonging to one of the two sexes? Existing evidence suggests that this process begins very early in life. By the time they are two, many children have learned to use *gender labels* appropriately; they refer to themselves as a boy or a girl and correctly label others as belonging to one sex or the other. However, they are still uncertain about the stability of gender. When asked "Could you ever become a daddy?" many little girls up until the age of about three and a half say yes, and little boys indicate that they could become a mother. Between three and a half and four and a half, however, children begin to understand the stability of gender over time—**gender constancy**. Is this delay due to children's cognitive immaturity? Recent evidence suggests that, in fact, it may stem from another factor: a child's lack of knowledge about genital differences between the sexes. Thus, children as young as three who are aware of genital differences show a grasp of gender constancy (Bem, 1989).

But through what process do children acquire gender identity? Several different theories have been proposed. According to *social learning theory*, two kinds of learning are involved: observational learning and operant conditioning. Through observational learning, children gradually come to match the behaviors of same-sex individuals, especially those of their parents. Further, such imitation is actively reinforced by adults. As children become increasingly similar to their same-sex parent, they gradually organize recognition of their own behavior and these similarities into the idea that they are "a girl like Mommy" or "a boy like Daddy."

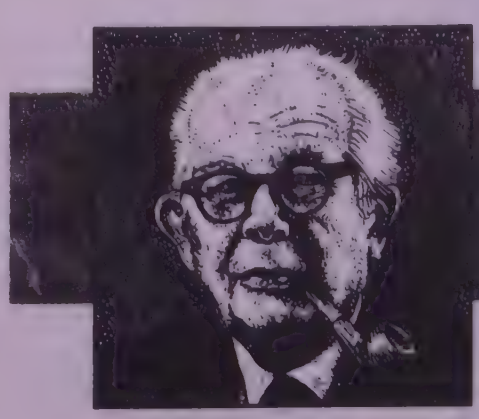
An alternative view of how children acquire gender identity has been proposed by Bem (1984). This approach, known as **gender schema theory**, focuses primarily on the *cognitive* mechanisms underlying gender identity. It suggests that acquisition of gender identity rests in part on the development of *gender schemas*. These are cognitive frameworks reflecting children's experiences with their society's beliefs about the attributes of males and females, such as instructions from their parents, observations of how males and females typically behave, and so on. Once a gender schema takes shape, it influences children's processing of a wide range of social information (Martin & Little, 1990). For example, children with a firmly established gender schema tend to categorize the behavior of others as either masculine or feminine. Similarly, they may process and recall behaviors consistent with their own gender schema more easily than ones not consistent with it. In short, for children possessing such schemas, gender is a key concept or dimension, one they often use in attempts to make sense out of the social world. Going further, this theory argues that children's *self-concept* becomes linked to the gender schema. Thus, they come to view their own preferences, attitudes, and behaviors as acceptable only to the extent that these are consistent with what is specified by the schema. As Bem puts it (1981, p. 355): "The gender schema becomes . . . a standard or guide . . . and self-esteem becomes its hostage."

Gender Identity: *Children's understanding of the fact that they are male or female.*

Sex-Stereotyped Behavior: *Patterns of behavior associated by society with each sex.*

Gender Constancy: *Children's understanding that gender is stable over time.*

Gender Schema Theory: *A theory that children develop a cognitive framework, or schema, reflecting the beliefs of their society concerning the characteristics and roles of males and females; this gender schema then strongly affects the processing of new social information.*



Jean Piaget (1892?–1980)

Piaget was a Swiss psychologist renowned for his extensive work with children and his theories about cognitive development. Piaget's theories, still widely used today, focused on *how* people think, rather than on *what* they think.

Renee Baillargeon

Noted for her research on children's cognitive abilities, Baillargeon has shown that children are more competent than Piaget's theory suggests. She found that even very young infants have a basic understanding of object permanence.

Carol Gilligan

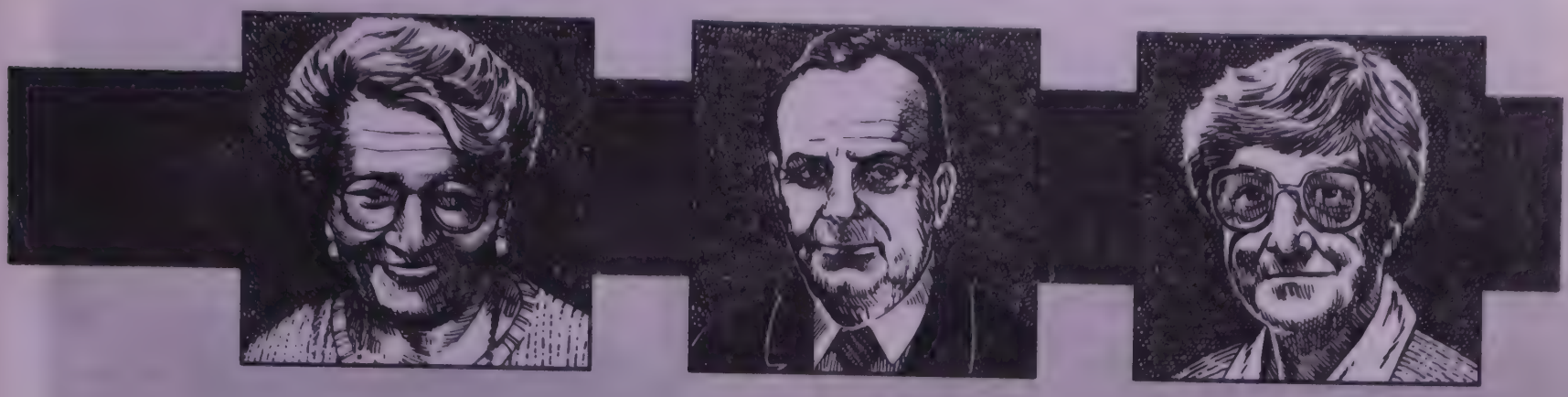
Gilligan is widely known for her work on gender differences. Some of her most fascinating research has focused on children's development of morality, and how girls and boys differ in their conceptions of relationships, caring, and justice.

KEY PEOPLE IN DEVELOPMENT

Which of these theories is most accurate? At present, it is difficult to choose between them; there is some evidence consistent with both. In fact, it seems likely that both social learning and cognitive processes are involved in the formation of gender identity. Together, then, these views provide a more complete picture of this process than any one of them does alone.

Sex-Stereotyped Beliefs and Behavior

At the same time that children are acquiring their gender identity, they also learn much more about their own society's views concerning gender. They acquire beliefs about the supposed characteristics of males and females—*sex-role stereotypes* or *beliefs*, and a basic understanding of how their society expects males and females to behave—*sex-stereotyped behaviors*. Unfortunately, such stereotypes are not neutral in content; they generally attribute more admired characteristics and behaviors to males than to females, at least in Western cultures. Thus, both boys and girls learn that males are—supposedly—independent, aggressive, dominant, and adventurous, while females are—again, supposedly—emotional, gentle, submissive, and passive (Deaux, 1993; Deaux & Lewis, 1986). Research on such gender-role stereotypes suggests that they increase in strength throughout childhood. For instance, when children are given adjectives typically attributed to males (tough, aggressive, dominant) and ones typically attributed to females (gentle, excitable, affectionate) and asked to assign these either to a male or female drawing, the proportion assigned in accordance with stereotypes increases with age (Best et al., 1977).



Mary Ainsworth

Recognized for her work on attachment, Ainsworth asserts that children's attachment to their parents affects later friendships, relations with relatives, and adult relationships.

Harry Harlow (1905–1981)

Harlow is best known for his research on emotional development. His studies with baby rhesus monkeys and wire surrogate "mothers" showed that early social deprivation is correlated with later socially deviant behavior.

Eleanor Maccoby

Maccoby's research interests are "sex differences and sex roles, parent-child interaction and the socialization process, family structure—in particular, divorce and single parenthood—and their impact on child development."

As you might expect, stereotypes and beliefs about **gender roles**, or expected behaviors of males and females, differ greatly from one culture to another as well as between groups and across time within a given culture. For example, in the United States, African-American children often hold less stereotyped views of women than do white children (Bardwell, Cochran, & Walker, 1986), perhaps because African-American children have been exposed to more women as heads of households and as principal family wage earners. Further, there has certainly been some change in gender stereotypes in many countries in recent decades. Yet such stereotypes continue to persist and to exert strong effects on developing children (e.g., Deaux, 1993).

How do children acquire sex-stereotyped beliefs and behaviors? Much of the answer involves the impact of various environmental influences, such as their families, teachers, and peers. All of these agents tend to behave in ways that strengthen beliefs that boys and girls differ in important ways and that certain activities are appropriate for boys and others for girls (McGuire, 1988; Weisner & Wilson-Mitchell, 1990). Recently, however, some psychologists have proposed that genetic factors, too, may play a role. For example, Eleanor Maccoby (1990), a noted developmental psychologist, proposes that hormonal differences between girls and boys influence their styles of play, with boys showing rough, noisy movement and girls calm, gentle actions.

Also, when they interact with peers, children tend to prefer playmates whose behavior matches their own. Thus, they gradually come to spend more and more time interacting with same-sex peers. At age four, children spend three times as much time with same-sex peers as with opposite-sex peers; and

Gender Roles: *Beliefs about how males and females are expected to behave in many situations.*

Boys and Girls: Contrasting Styles of Interaction

Careful observations suggest that girls are often at a disadvantage when interacting with boys (Maccoby, 1990). They are more polite and restrained and, as a result, exert less influence on the group and its activities.

Key Points

- Most children do not acquire understanding of gender constancy—the fact that their sexual identity is stable—until they are about four.
- Children acquire gender identity through social learning and through development of gender schemas—cognitive frameworks relating to gender.
- Children also acquire sex-stereotyped beliefs about the supposed characteristics of males and females and how they are expected to behave.
- Gender differences are acquired primarily through learning, but genetic factors may also play a role.

by the time they are six, this ratio has risen to eleven to one (Maccoby & Jacklin, 1987). Observation of children's play supports these suggestions. Groups of boys engage in much more rough-and-tumble play than groups of girls. Further, for males, maintaining their status within the group seems to be much more important than for girls. As a result, when boys and girls do come together in mixed-sex groups, girls may be at a distinct disadvantage (Maccoby, 1990). Girls behave more politely than boys, waiting for a turn to speak—which may never come! And they often attempt to exert influence by polite requests rather than through demands or physical force. Unfortunately, males, who have learned to assert their independence in order to maintain high status, are unlikely to respond to such tactics, with the result that girls may exert little influence. As Maccoby (1990) notes, such differences in style of social interaction are potentially important, especially during the current period of profound change, when many females are moving into positions of power and authority.

Making Psychology Part of Your Life

Being a Successful Parent

Do you plan on having children? If so, this will be one of the most important choices of your life, for it is one of the few decisions that cannot be unmade. Once you are a parent, you are a one for life. Also, raising children is one of the most important jobs anyone can do. Given these facts, I'm sure that you want to be as effective as possible in your role as a parent. Psychology has much to offer in this regard. Here are some basic principles you can apply, if parenthood turns out to be in your future.

1. *Don't expect too much too early.* Many first-time parents seem to expect their children to beat the averages in all respects—to walk, talk, and do just about everything else ahead of what the charts suggest. And they are bitterly disappointed if this isn't the case. Avoid such unrealistic expectations: They can be counterproductive both for you and your child.

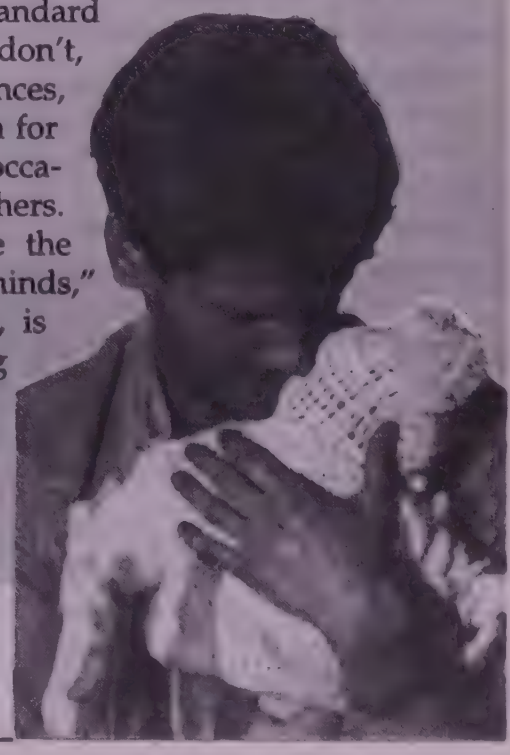
2. *Don't assume that children can reason like adults.* It is all too tempting for college-educated parents to assume that they can reason with their children in many situations. In fact, young children *can't* think and reason like adults. So don't expect too much in this respect, and be ready to substitute other techniques when reasoning fails. One that may prove useful is to turn situations in which children are behaving in unacceptable ways into joint problem-solving projects—on a child's level. "How can we fix this?" "How can we solve this problem?" These are sentences even young children can understand and that don't require them to reason about abstract concepts such as fairness or consideration for others.

3. *Never let your child "divide and conquer."* Young children are opportunists and don't yet have the cognitive capacity to decide what is right and what is wrong in the ways adults do. As a result, they are quick to notice and exploit disagreements between their parents. *Don't let this happen.* Establish as few rules as possible, but stick together. A united parental team is far more impressive to children than one that shows discrepancies.

4. *Remember that you are always a model for your child.* Children acquire a tremendous amount of information, and many aspects of behavior, by observing adults. They are very adept at noticing and will often watch quietly from the sidelines. Try to keep this fact clearly in mind. Many parents are shocked when their children repeat to friends or relatives—usually at the most embarrassing moment imaginable—things the parents never expected them to hear. And always remember to practice what you preach. If you say one thing but do another, guess which—words or deeds—will carry greater weight?

5. *Choose a day-care center carefully.* If both you and your spouse work, some form of day care will probably be essential. Choosing a center is a *very* important decision. Before placing your child in such a facility, find out (a) who is running it, (b) what their credentials are, (c) what kind of state or local inspection it must pass, and (d) what specific programs and activities it provides. If you don't check into such matters, the care your child receives may be less effective than you, as a concerned parent, wish. Even worse, the philosophy and techniques used by the center may contradict your own. This can be confusing to children and should be avoided. So *choose carefully.*

6. *Be consistent.* If there's one thing children find confusing, it's *inconsistency* on the part of their parents. If you set a rule for your children, be sure to stick to it. One of the surest ways to undermine your authority is to enforce rules on some occasions but not on others. If you do bend a rule occasionally, be sure to make it clear that this is indeed a special situation, and that at other times the standard rule will apply. And don't, under any circumstances, punish your children for infractions on some occasions but not on others. Consistency may be the "hobgoblin of little minds," but that, in a sense, is what you are dealing with where children are concerned: minds—and consciences—in formation.



Parenting is a life-long role, one of the most challenging yet rewarding experiences a person can have.

Summary and Review of Key Points

Physical Growth and Development

Key Terms:

developmental psychology, p. 296; physical growth and development, p. 296; cognitive development, p. 297; social and emotional development, p. 297; childhood, p. 297; embryo, p. 297; fetus, p. 297; teratogens, p. 298; placenta, p. 298; longitudinal research, p. 304; cross-sectional research, p. 304; cohort effects, p. 304; longitudinal-sequential design, p. 304

- Physical growth is rapid during the prenatal period. From a speck, smaller than the period at the end of this sentence, the developing child increases to more than 7 pounds (3.17 kilograms) and 20 inches (50.8 cm) at birth.
- Many environmental factors can adversely affect the developing fetus. These include diseases, drugs, alcohol, and smoking by prospective mothers. The precise time during pregnancy when these harmful agents occur can strongly determine the extent of the harm experienced by the fetus.
- Ingenious methods of research have revealed that infants and newborns are capable of perceiving many aspects of the physical world. They can distinguish between different colors, sounds, and tastes, and they prefer certain patterns—for example, the human face. They can perceive depth by the time they are two or three months old.

Cognitive Development

Key Terms:

stage theory, p.305; adaptation, p. 305; assimilation, p. 305; accommodation, p. 305; sensorimotor stage, p. 305; object permanence, p. 305; preoperational stage, p. 306; make-believe play, p. 306; egocentrism, p. 306; conservation, p. 307; concrete operations, p. 307; formal operations, p. 307; hypothetico-deductive reasoning, p. 307; propositional reasoning, p. 307; private speech, p. 308; attention-deficit hyperactivity disorder, p. 311; script, p. 312; metacognition, p. 312; moral development, p. 315; preconventional level, p. 315; conventional level, p. 316; postconventional level, p. 316

- According to Piaget, young children do not think or reason like adults. They acquire adult cognition only after passing through a series of discrete stages of cognitive development. In the sensorimotor stage, infants acquire basic understanding of the links between their behavior and the effects it produces. In the preoperational stage, babies can form mental representations of the external world; however, they show egocentrism in their thinking and are unable to understand that others perceive the world differently from themselves. In the stage of concrete operations, children are capable of logical thought and show understanding of conservation and the reversibility of physical operations. Finally, in the stage of formal operations, older children and adolescents can think logically, manipulate abstract concepts in their minds, and engage in propositional reasoning.
- Piaget's theory has been challenged on several grounds. Young children attain key cognitive milestones much earlier than he proposed. Further, children generally do not seem to pass through discrete stages of cognitive development. Finally, Piaget underestimated the importance of language and social interactions in cognitive development.
- The information-processing perspective provides a sharply different view. According to this approach, cognitive development involves the increasing ability actively to process, store, retrieve, and manipulate information.
- Infants can form prototypes—mental representations of external stimuli—within hours of birth. They rapidly acquire the ability to notice increasingly fine-grained features of the external world.
- Babies' ability to focus their attention on tasks they are performing increases rapidly, as does planfulness—the capacity to decide actively where and how to direct attention. As they grow older, children acquire increasingly sophisticated strategies for enhancing their own memory and expand their domain-specific knowledge. Finally, they acquire increasingly sophisticated understanding of their own cognitive processes—metacognition.
- Kohlberg's theory of moral development suggests that all human beings move through a series of stages of moral reasoning. At the preconventional level, morality is judged largely in terms of its consequences. At the conventional level, morality is judged in terms of laws and rules of society. At the postconventional level, morality is judged in terms of abstract principles and values.

	• Moral reasoning does increase with age, but environmental factors such as level of education, parents' child-rearing practices, and cultural traditions also play important roles. Contrary to initial findings, there is no evidence that males and females attain different levels of moral development or reasoning.
Social and Emotional Development Key Terms: social referencing, p. 320; temperament, p. 320; attachment, p. 322; ethological theory, p. 322; strange situation test, p. 323; secure attachment, p. 323; avoidant attachment, p. 323; resistant attachment, p. 323; disorganized (or disoriented) attachment, p. 323	• Infants show a wide range of recognizable facial expressions. As they grow older, they also acquire increasing ability to "read" the emotions of others and to regulate their own emotions. Differences in temperament—consistent individual differences in quality and intensity of emotions—are present very early in life. Such differences are relatively stable, at least for persons at the extremes of several dimensions of temperament. Biological factors play a role in temperament, but it is also affected by external factors such as cultural and child-rearing practices. • Infants quickly form a strong emotional bond with their caregivers; this is known as attachment. Basic learning processes play a role in attachment, but the fact that infants are born with responses that elicit caregiving from adults appears to be even more crucial. Most infants form secure attachments to their caregivers, but others form insecure, avoidant, or disorganized attachments. • The strength of attachment can be measured by the strange situation test. Placing infants in day care does not necessarily interfere with the formation of secure attachment to parents. Contact comfort, close physical contact between infants and caregivers, plays a role in the formation of attachment.
Gender Key Terms: gender, p. 326; gender identity, p. 327; sex-stereotyped behavior, p. 327; gender constancy, p. 327; gender schema theory, p. 327; gender roles, p. 329	• Many children do not acquire understanding of gender constancy—the fact that their sexual identity is stable—until they are at least four. Such understanding may occur earlier, however, if children acquire knowledge of the physical differences between the sexes. Children acquire gender identity through social learning and through development of gender schemas. Children also acquire sex-stereotyped beliefs about the supposed characteristics of males and females and how they are expected to behave. • Gender differences are acquired primarily through learning, but there is some indication that genetic factors such as hormonal differences between girls and boys may also influence this process.

Critical Thinking Questions

Appraisal	Physical, cognitive, and emotional/social development occur simultaneously. Given this fact, does it make sense to try to study each one separately?
Controversy	Growing evidence suggests that genetic factors, such as differences in hormonal levels, may play a role in the development of at least some differences in the behavior of boys and girls. These differences, in turn, may influence several aspects of their development. Do you think that these findings mean that efforts to ensure equal opportunities for women in all walks of life will run into obstacles that can't be overcome? If so, why? If not, why?
Making Psychology Part of Your Life	Many parents worry about the impact on their children of television, movies, and other forms of the mass media. Do you think that such concerns are justified? And if so, how can you—when you are a parent—reduce these potential harmful effects on your own children? Should society play an active role in this respect, by regulating the content of television programs and movies?

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9

Imagine that, as in the movie *Back to the Future*, a scientist invents a time machine. You enter this apparatus and are transported twenty-five years into the future, where you encounter . . . yourself! Assuming that no violent explosion occurs, will you recognize your older self? How will you look? Will your future self show the same personality characteristics as you do now? Will this person share your attitudes, beliefs, and feelings? Will this future self, in fact, be *you*? These are intriguing questions and ones to which there are no simple answers, for as noted in chapter 8, change is indeed the only constant where

CULTURE AND ADOLESCENCE

In this adolescent initiation ceremony, an Apache community celebrates a young girl's reaching puberty with an elaborate ritual.

DEVELOPMENT DURING ADULTHOOD DERIVES PRIMARILY FROM THE EFFECTS OF VARIED LIFE EXPERIENCE.

human beings are concerned. Expanding on this basic theme, consider the following quotation by Honus Wagner, a famous baseball player of the early twentieth century whose insight into human behavior was apparently greater than his grasp of grammar: "Things ain't never gonna be the same again, but we don't know *how* they ain't never gonna be the same again."

Applied to human development, this striking statement implies that we do change in many different ways as we move through life's journey during our adult years; but that no, we can't be sure just how we will change and in what specific directions. Some of our central traits can remain stable for years or even decades. Yet others alter greatly—so much that it might be difficult for you to recognize future versions of yourself if you could meet them.

One important reason for uncertainty in predicting change during our adult years is as follows: While development during childhood is determined to an important extent by *maturation*—physical growth and change—development during adulthood derives primarily from the effects of varied life experience. True, we do change physically during our adult years, but such change is slower than that during childhood (Briggs, 1990). As a result, development during the long decades we spend as adults is tied even more closely to social and environmental factors than is true during childhood. Since such experience is unique for each individual, the course of development, too, is highly variable. For example, while practically all children learn to crawl, then to walk, and finally to run, *not* all adults experience a midlife crisis. In fact, for many, the very idea of such a crisis seems far-fetched.

But how, precisely, do we change during the years after childhood? Continuing the discussion of human development begun in chapter 8, this chapter will trace some of the changes that individuals encounter during *adolescence*—the years between *puberty* (sexual maturity) and entry into adult status—and during *adulthood*—the remaining decades, which constitute the largest portion of our lives. As in chapter 8, we'll consider changes during both of these periods under three major headings: *physical*, *cognitive*, and *social* or *emotional* development. And as *aging* and *death* are inevitable facts of life, these topics, too, will be part of our discussion.

ADOLESCENCE: Between Child and Adult

Adolescence: *A period beginning with the onset of puberty and ending when individuals assume adult roles and responsibilities.*

Puberty: *The period of rapid change during which individuals reach sexual maturity and become capable of reproduction.*

When does childhood end? When does adulthood start? Since development is a continuous process, there are no hard-and-fast answers to these questions. Rather, every culture decides for itself just where the dividing line falls. Many cultures mark this passage with special ceremonies; individuals enter as children and emerge a few hours or days later as adults. In many Western countries, however, the transition from child to adult takes place more gradually, during a period known as **adolescence**, which lasts for several years.

Adolescence has traditionally been viewed as beginning with the onset of **puberty**, a sudden spurt in physical growth accompanied by sexual maturity,

and as ending when individuals assume the responsibilities associated with adult life—marriage, entry into the workforce, and so on (Rice, 1992). Again, though, I wish to emphasize that entry into adolescence, the length of this phase, and even whether a distinct period of adolescence is assumed to exist are all matters that are culturally defined. In the United States, for instance, the idea of a separate period of adolescence did not gain widespread acceptance until well into the twentieth century. Before that time, children were called on to perform various jobs as soon as they were large enough to do so, and they assumed adult roles and responsibilities gradually. Now, in contrast, a distinct period of adolescence exists; moreover, in recent years it has shown signs of expanding so that children enter this phase at ever earlier ages. Such trends emphasize the fact that the definition of adolescence is largely a social one, determined by each culture; and that, moreover, ideas concerning this part of life can change greatly *within* a given culture over time.

ADOLESCENCE IN HISTORICAL CONTEXT

Until recently, there was no recognition in the United States of adolescence as a distinct developmental phase. At the turn of the century, for example, young persons were expected to take on adult responsibilities and roles.

PHYSICAL DEVELOPMENT DURING ADOLESCENCE

As mentioned in chapter 8, the beginning of adolescence is signaled by a sudden increase in the rate of physical growth. While this *growth spurt* occurs for both sexes, it starts earlier for girls (at about age ten or eleven) than for boys (about age twelve or thirteen). Prior to this spurt, boys and girls are similar in height; in its early phases, girls are frequently taller than boys; after it is over, males are several inches taller on average than females.

This growth spurt is just one aspect of the process of *puberty*, the period of rapid change during which individuals reach sexual maturity and become capable of reproduction (Rice, 1992). During puberty the *gonads*, or sex glands, produce increased levels of sex hormones, and the external sex organs assume their adult form. Girls begin to *menstruate* and boys start to produce sperm. In addition to these changes, which are often referred to as *primary sexual characteristics*, both sexes undergo many other shifts relating to sexual maturity. Boys develop facial and chest hair and their voices deepen. Girls experience breast enlargement and a widening of their hips; both sexes develop pubic hair. There is great variability in the onset of sexual maturity Most girls begin to menstruate by the time they are thirteen; but for some this process does not start until age fifteen or sixteen, and for others it may commence as early as age seven or eight. Interestingly, a higher percentage of body fat is associated with an earlier start of menstruation, while vigorous exercise tends to delay it (Stager, 1988). Most boys begin to produce sperm by the time they are fourteen or fifteen, but for some the process may begin considerably earlier or later. As you undoubtedly know from your own experience, many adolescents find the rapid pace of these changes disconcerting.

Facial features, too, often change during puberty. Characteristics associated with childhood, such as large eyes, a high forehead, round cheeks, and a small chin, give way to a more adult appearance (Berry & McArthur, 1986). Recent studies indicate that such changes are of considerable importance. For example, individuals who retain childlike facial features—a *baby face*—are perceived as being weaker, more naive, and more submissive than persons

PUBERTY AND THE GROWTH SPURT

Girls tend to mature somewhat earlier than boys do; they experience the growth spurt one to two years sooner.

who do not retain such features. Interestingly, baby-faced people are also perceived as being more honest, warm, and sincere than average (Berry, 1991). Baby-facedness is also related to attractiveness in both sexes, although the direction of such effects differs for males and females. Males generally find baby-facedness on the part of females to be attractive; however, females do not find baby-facedness attractive in males (Berry & Zebrowitz-McArthur, 1988).

Sex differences also exist with respect to the effects of early sexual maturation. Early-maturing boys seem to have a definite edge over those who mature somewhat later. They are stronger and more athletic than their later-maturing counterparts, and so often excel in competitive sports. Partly as a result of these advantages, they tend to be more self-assured and popular and are often chosen for leadership roles (Blyth, Bulcroft, & Simmons, 1981). Fortunately for me, I was an early-maturing teenager, and I can still remember the envy with which some of my friends noticed my newly sprouted beard, and their comments about other signs of sexual maturity when we showered together after gym.

In contrast, early sexual maturation seems to confer fewer benefits on girls. Early-maturing girls are taller than their classmates—frequently taller than boys of their age—and their increased sexual attractiveness may invite envy from classmates and unwanted sexual advances from older persons (Peterson, 1987). In short, the timing of puberty can play an important role in adolescents' developing self-identities and so in their later social development. We'll return to such relationships in a later section.

COGNITIVE DEVELOPMENT DURING ADOLESCENCE

Do adolescents think and reason like adults? As we saw in chapter 8, Piaget believed that in many respects they do. In the stage of *formal operations*, adolescents can assess the validity of verbal statements, reason deductively, and show many other logical capabilities. Yet Piaget contended that adolescents' thinking still falls short of that of adults in several important respects. They use their newfound cognitive skills to construct sweeping theories about various aspects of life, but these theories are naive because of adolescents' lack of experience. Similarly, they show tendencies toward *egocentrism*, assuming, rigidly, that no other views but their own can be correct.

The idea that adolescents' thinking is inferior to—or at least sharply different from—that of adults is echoed by many other theorists. For example, Elkind (1967) suggested that adolescents often go seriously astray when they try to conceptualize the thoughts of other persons. First, they fail to differentiate others' thoughts from their own. This tendency leads them to assume that they are the focus of others' attention, a phenomenon Elkind termed the *imaginary audience*. Adolescents often believe that others are focusing attention on them, and so become painfully self-conscious in many situations. In addition, they often believe that their feelings and thoughts are totally unique—that no one else on the planet shares their experiences. Elkind (1967) referred to this as the *personal fable*.

These are intriguing ideas and have captured the attention of psychologists, educators, and parents for decades. But are they correct? Does the thinking of adolescents actually differ appreciably from that of adults? Surprisingly, growing evidence suggests that the magnitude of such differences is smaller than everyday experiences—and several theories—suggest (Beyth-Marom et al., in press; U.S. Office of Technology Assessment, 1991). Perhaps the most intriguing research pointing to this conclusion is that concerned with the question of whether adolescents and adults think about *risk* in different ways.

Adolescent Invulnerability: Do Adolescents Think Differently Than Adults Do about Risk? That adolescents engage in lots of high-risk behaviors, ranging from unprotected sex to reckless driving, is obvious. One widely accepted explanation for this fact is that young persons suffer from what has been termed **adolescent invulnerability**—the belief that they are somehow immune from the potential harm of high-risk behaviors (Baron & Brown, 1991). Is this view correct? Surprisingly, it is *not* supported by all research findings. Studies (e.g., Fischoff, 1992; Quadrel, 1990) indicate that adolescents are no more likely than adults to view themselves as impervious to negative outcomes from risky behavior.

A very clear illustration of this point is provided by a study conducted recently by Quadrel, Fischoff, and Davis (1993). These researchers asked individuals in three groups—teenagers living in group homes for troubled teens, teenagers living at home with their parents, and the latter group's parents—to rate the probability that each of eight negative events would happen to them. The events included four that were judged to be high in perceived controllability (auto accident injury, alcohol dependency, unplanned pregnancy, mugging), and four judged to be low in controllability (sickness from air pollution, injury in an explosion, sickness from pesticides, and sickness from radiation). After rating how likely they themselves were to experience these events, participants in all three groups rated the likelihood that other persons—an acquaintance and a close friend—would experience them. In addition, the teenagers living with their parents rated the likelihood that the parents would experience these outcomes, and the parents did the same for their children. Results were clear: The teenagers did *not* rate themselves as more invulnerable than the adults; that is, as less likely to experience these negative events. In fact, if anything, the teens living at home with their parents showed less tendency toward beliefs in their own invulnerability than did the parents! So, in sum, adolescents and adults do not seem to differ greatly in terms of the way they think about risks.

Why, then, are adolescents more likely to engage in high-risk behaviors? Several factors may play a role. Perhaps adolescents find the rewards associated with such actions so pleasurable that they are not deterred even by the threat of serious potential harm. Alternatively, many adolescents may belong to groups whose *social norms*—rules about what is and is not appropriate behavior—favor high-risk actions. In short, they engage in such actions because their friends both expect and encourage them to do so. As we'll see in chapter 13, social norms seem to play an important role in teenagers' willingness to engage in unprotected sex, even if they fully understand the risk of AIDS and other sexually transmitted diseases (e.g. Fisher & Misovich, 1989).

Together, these and other factors may help explain the gap between adolescents' beliefs—their recognition of the fact that they are *not* invulnerable to harm—and their tendency to engage in actions that threaten their health or safety.

Physical Change during Adolescence: Sometimes It's Disconcerting

The rapid pace of physical change sometimes makes adolescents feel like the character in this cartoon. (*Source:* THE NEW BREED by Randy Glasbergen. Copyright 1990, Randy Glasbergen. Reprinted by permission.)

Key Points

- Puberty is a period of rapid change during which individuals reach sexual maturity and become capable of reproduction.
- Boys who undergo puberty early experience several advantages relative to those who mature later. For girls, the benefits of early maturity are offset by several negative factors.
- Growing evidence suggests that any differences between the thinking of adolescents and that of adults are smaller than was previously believed.
- Adolescents do not appear to differ from adults in terms of perceiving themselves as invulnerable to harm.

Social and Emotional Development during Adolescence

It would be surprising if the major physical and cognitive changes occurring during adolescence were not accompanied by equally extensive changes in social and emotional development. After all, as we'll see in detail in chapter 16, our appearance and our abilities to think about others in various complex

Adolescent Invulnerability: *Adolescents' belief that they are immune from the potential harm of high-risk behaviors.*

ADOLESCENTS: A PROPENSITY FOR HIGH-RISK BEHAVIORS

Adolescents often engage in high-risk behaviors. Is this because they feel *invulnerable* to the potential risks of such actions? Recent evidence casts doubt on this widely held belief.

ways can strongly affect their reactions to us and our reactions to them. What, then, are some of the major social and emotional changes occurring during adolescence?

EMOTIONAL CHANGES: THE UPS AND DOWNS OF YOUTH Common folklore suggests that adolescents are unpredictable creatures, prone to wide swings in mood and wild outbursts of emotion. Are these assertions true? To a degree, they are. In several studies on this issue, large numbers of teenagers wore beepers and were signaled at random times throughout an entire week. When signaled, they were to enter their thoughts and feelings in a diary. Results indicated that they did in fact show frequent and large swings in mood—from the heights to the depths (Csikszentmihalyi & Larson, 1984). Moreover, these swings occurred very quickly, sometimes within only a few minutes. Older people also show shifts in mood, but theirs tend to be less frequent, slower, and smaller in magnitude. So some evidence supports the view that adolescents, at least in Western nations, are more emotionally volatile than adults.

Other widely accepted views about adolescent emotionality, however, do not appear to be correct. For example, it is often assumed that adolescence is a period of great stress and unhappiness. In fact, this does not appear to be the case. On the contrary, most teenagers report feeling quite happy and self-confident, *not* unhappy or distressed (Offer & Sabshin, 1984). Moreover, and again contrary to a prevailing stereotype about adolescence, most teenagers report that they enjoy relatively good relations with their parents. They agree with them on basic values; on future plans, such as whether they should go to college; and on many other matters (Bachman, 1987; National Association of Secondary School Principals, 1984). There are, of course, some points of friction: Teenagers often *disagree* with their parents about how they should spend their leisure time; how much money they should have or spend; and to some extent their sexual behavior (Kelley & Byrne, 1992). By and large, however, the so-called *generation gap* is much smaller and more limited in scope than many people have assumed (Galambos, 1992).

SOCIAL DEVELOPMENT: FRIENDSHIPS, THE QUEST FOR IDENTITY, AND SEXUALITY While most adolescents report mainly positive relations with their parents, such family-based relationships are only a part of the total picture in the social development of adolescents. *Friendships*, primarily with members of one's own sex but also with members of the other sex, become increasingly important. And along with sexual maturity, of course, comes the capacity for—and interest in—romantic and sexual relationships.

Friendships confer many obvious benefits: Within these relationships adolescents practice, and improve, a wide array of social skills (Berndt, 1992) and develop the capacity for *intimacy*—the capacity to share their innermost thoughts and feelings with another person.

While adolescents' growing and deepening friendships confer important benefits, the potential downside of such relationships should not be ignored. Many studies indicate that adolescents often experience intense conflict with friends—conflict that can leave serious psychological scars. And in recent years newspapers have reported many tragic events in which adolescents, filled with sexual jealousy, have attacked and actually murdered their lovers or rivals—sometimes even in school. In addition, adolescents can often acquire undesirable attitudes and patterns of behavior from friends (Shantz & Hartup, 1993). For example, they may be influenced to smoke, consume alcohol or other drugs, or engage in sexual relations because some of their friends do so. As Berndt (1992) notes, however, influence among adolescent friends

is reciprocal, flowing in both directions; so the potential negative effects of having "wild" or risk-taking friends should not be overemphasized.

Friendships also play an important role in another key aspect of social development during adolescence—the quest for a *personal identity*. This process is a pivotal element in an influential theory of psychosocial development proposed by Erik Erikson (1950, 1987).

ADOLESCENT FRIENDSHIPS

Friendships are an important aspect of adolescence. They can have either a positive influence, helping adolescents improve their social skills and giving them a sense of belonging, or a negative influence, encouraging undesirable attitudes and potentially harmful behaviors.

ERIKSON'S EIGHT STAGES OF LIFE Erikson's theory deals with development across the entire life span. It could have been presented in chapter 8, in the discussion of childhood; alternatively, it could be described later in this chapter, in the context of development during our adult years. Since adolescence is in some respects a bridge between childhood and adulthood, though, it seems reasonable to examine it here.

Erikson's theory is, like the one proposed by Piaget, a *stage* theory: It suggests that all human beings pass through specific stages or phases of development. In contrast to Piaget's theory, however, Erikson's is concerned primarily with social rather than cognitive development. Erikson believed that each stage of life is marked by a specific crisis or conflict. Only if individuals negotiate each of these hurdles successfully can they continue to develop in a normal, healthy manner.

The stages in Erikson's theory are summarized in the **Key Concept** feature (on page 343). The first four occur during childhood; one takes place during adolescence; and the final three occur during our adult years. The first stage, which occurs during the first year of life, centers on the crisis of *trust versus mistrust*. Babies must trust in others to satisfy their needs. If these needs are not met, they fail to develop feelings of trust in others and remain forever suspicious and wary.

The second crisis occurs during the second year of life and involves *autonomy versus shame and doubt*. During this time, toddlers are learning to regulate their own bodies and to act in independent ways. If they succeed in these tasks, they develop a sense of autonomy. But if they fail, or if they are labeled as somehow inadequate by the persons who care for them, they may experience shame and doubt their abilities to interact effectively with the external world.

The third stage takes place during the preschool years, between the ages of three and five. The crisis then involves *initiative versus guilt*. At this time, children are acquiring many new physical and mental skills. Simultaneously, however, they must develop the capacity to control their impulses, some of which lead to unacceptable behavior. If they strike the right balance between feelings of initiative and feelings of guilt, all is well. However, if initiative overwhelms guilt, children may become too unruly for their own good; if guilt overwhelms initiative, they may become too inhibited.

The fourth and final stage of childhood occurs during the early school years, when children are between six and eleven or twelve years of age. This stage involves the crisis of *industry versus inferiority*. During these years, children learn to make things, use tools, and acquire many of the skills necessary for adult life. Children who successfully acquire these skills form a sense of their own competence; those who do not may compare themselves unfavorably with others and suffer from low self-esteem.

Now we come to the crucial stage in Erikson's theory for this discussion of adolescence: the crisis of *identity versus role confusion*. At this time of life, individuals ask themselves, "Who am I?" "What am I *really* like?" "What do I want to become?" In other words, they seek to establish a clear *self-identity*—an understanding of their own unique traits and what is really of central importance to them. These, of course, are questions individuals ask themselves at many points in life. According to Erikson, though, during adoles-

Erik Erikson
(1902–1994)

A native of Germany, Erikson emigrated to the United States in 1933 and became Boston's first child psychoanalyst. Erikson coined the term "identity crisis" and is perhaps best known for his eight-stage theory of psychosocial development. According to Erikson's theory, each stage is defined by a specific identity crisis and its developmental resolution.

Key People in Development

cence it is crucial that these questions be answered effectively. If they are not, individuals may drift along, uncertain of where they want to go or what they wish to accomplish.

Adolescents adopt many different strategies to help them resolve their own personal identity crises. They try out many different roles—the good girl/boy, the rebel, the dutiful daughter/son, the athlete—and join many different social groups. They consider many possible *social selves*—different kinds of persons they might potentially become (Markus & Nurius, 1986). Out of these experiences, they gradually piece together a cognitive framework for understanding themselves—a *self-schema*. Once formed, this framework remains fairly constant and serves as a guide for adolescents in many different contexts.

The remaining three stages in Erikson's theory relate to crises we face as adults. Since we'll consider them in our later discussion of adult development, we won't examine them here. However, they are included, and described, on the **Key Concept** page.

Key Points

- According to Erikson's theory, social development involves the resolution of a series of internal crises.
- For adolescents the most important of these concerns establishing a clear self-identity.
- Adolescents try out many roles and many social selves before establishing a clear self-schema.

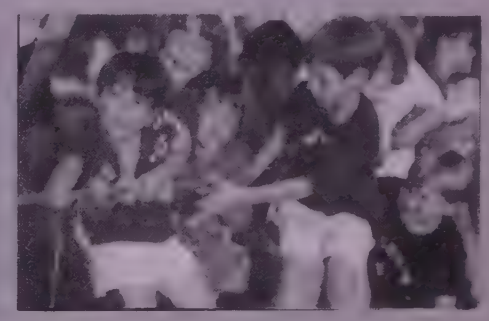
Adolescence in the 1990s: A Generation at Risk

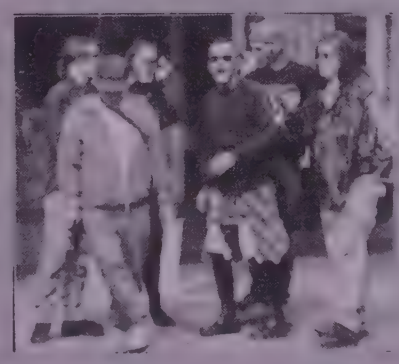
There have been many periods in the world's history when adolescents were at great risk with respect to psychological and physical harm. Warfare, revolutions, plagues, invasion and conquest by foreign powers—such events have

Key Concept

Erickson's Eight Stages of Psychosocial Development

Crisis/Phase	Description
Trust versus mistrust	Infants learn either to trust the environment (if their needs are met) or to mistrust it (if their needs are not consistently met).
Autonomy versus shame and doubt	Toddlers acquire self-confidence if they learn to regulate their own bodies and act independently. If they fail or are labeled as inadequate, they experience shame and doubt.
Initiative versus guilt	Preschoolers (3–5 years old) acquire many new physical and mental skills but must also learn to control their impulses. Unless a good balance is struck between skills and impulses, they may become either unruly or too inhibited.
Industry versus inferiority	Children (6–11 years old) acquire many skills and competencies. If they take justified pride in these, they acquire high self-esteem. If, in contrast, they compare themselves unfavorably with others, they may develop low self-esteem.
Identity versus role confusion	Adolescents must integrate various roles into a consistent self-identity. If they fail to do so, they may experience confusion over who they really are.
Intimacy versus isolation	Young adults must develop the ability to form deep, intimate relationships with others. If they do not, they may become socially or emotionally isolated.
Generativity versus self-absorption	During adulthood individuals must take an active interest in helping and guiding younger persons. If they do not, they may become preoccupied with selfish needs and desires.
Integrity versus despair	In the closing decades of life, individuals ask whether their lives have had any meaning. If they can answer yes, they attain a sense of integrity. If they answer no, they may experience deep despair.





repeatedly torn the social fabric and crushed families in every corner of the world. In view of such events, it is difficult to contend that today's adolescents face a more dangerous and threatening world than those of preceding generations. Yet they *do* seem to face a new and uniquely disturbing set of problems. Consider a few facts:

- In 1950 less than half of all adolescents used alcohol before entering high school; forty years later, 65 percent reported using it by the ninth grade (Gans & Blyth, 1990).
- Adolescents living in the United States are fifteen to twenty times more likely to die from homicide than their counterparts living in other industrialized nations.
- From 1960 to 1990, the proportion of adolescents suffering from sexually transmitted disease increased fourfold (National Center for Education in Maternal and Child Health, 1990).
- The rate of suicide among ten- to fourteen-year-olds has tripled in recent years; it has doubled among fifteen- to nineteen-year-olds (U.S. Bureau of the Census, 1991).
- Fully one-fourth of all adolescents in the United States do not live with both of their parents; among African-American children, this figure approaches 60 percent.

These and related statistics tell a sad tale. When I consider them in the light of my own experience as an adolescent during the 1950s, they take on an even deeper meaning. Although I lived in a working-class part of town, I never knew anyone whose parents were divorced. And the worst violence I ever witnessed was an occasional fistfight. The world I experienced as an adolescent was *very* different from the one many teenagers face today—so different that many psychologists have reached the conclusion that in the 1990s adolescents face a set of conditions and perils unlike that encountered by any recent generation (Takanishi, 1993). Taking note of this fact, the influential journal *The American Psychologist* recently devoted an entire issue to the topic of adolescence, with special focus on the problems and risks faced by today's teens. Let's now examine some of the problems identified in this issue.

Divorced, Parent-Absent, and Blended Families At present more than half of all marriages in the United States and many other countries end in divorce. This means that a large proportion of children and adolescents will spend at least part of their lives in a one-parent family—typically with their mothers (Norton & Moorman, 1987). Adolescents react to divorce with fear, anxiety, and feelings of insecurity about the future. Further, many blame one of the parents for the divorce: "What did she do to make Daddy leave?" "How can he desert us like this?" Some adolescents turn these feelings inward and experience considerable self-blame and guilt, sensing that *they* were responsible in some manner for the breakup.

The effects of divorce on adolescents' emotional well-being depend on many different factors, including the quality of the care they received before the divorce (Raphael et al., 1990) and the nature of the divorce, amicable or filled with anger and resentment. The more negative the feelings of the parents toward one another, the more likely the emotional harm to the adolescent. In addition, adolescents described as *academic underachievers*—those whose academic performance is below what their intelligence would predict (McCall, 1994)—are more likely to come from divorced than two-parent homes.

Adolescents living in *parent-absent* families face another set of problems. A growing percentage of children are being born to unmarried mothers, and many of these youngsters never even know their fathers. What are the risks associated with growing up in a parent-absent (typically *father-absent*) family? Research findings suggest that they include the following: increased risk for delinquent behaviors, reduced school performance, and difficulties in forming meaningful relationships—including stable romantic ones—with members of the opposite sex (Eberhardt & Schill, 1984).

***Father Knows Best:* A 1950s View of Family**

During the 1950s, American television shows painted a glowing picture of the joys of family life. Even then, few families could live up to this unrealistic image.

Based on the discussion so far, you might assume that the happiest outcome for adolescents from single-parent families would be the remarriage of their remaining parent. However, when divorced or single parents marry, adolescents find themselves facing other problems. The resulting **blended families**, consisting of one biological parent, one step-parent, and perhaps siblings and step-siblings, create new complications. Concerns over favoritism by parents toward their biological children, rivalries with step-siblings, and friction with step-parents can to be intense and may generate painful conflicts. These problems of blended families are intensified by the fact that most step-parents, having had experience with being a parent to their own children, expect the role of step-parent to be one they can readily fulfill. Imagine their shock—and anger—when their step-children make such comments as "You're not my real mother/father; I don't have to listen to you!" Clearly, then, shifting patterns of birth, marriage, divorce, and remarriage create serious problems for today's adolescents—problems that are much more common and complex than those faced by adolescents in the past.

Dysfunctional Families: The Intimate Enemy During the 1950s, television shows in the United States painted a glowing picture of family life. A caring, loving mother, a kind and wise father, considerate siblings—this was the image portrayed on the screen. Even as a teenager, I knew that there was a sizable gap between these images and reality. For many of today's adolescents, however, it's not so much a gap as a chasm. Many teenagers find themselves in what is currently termed **dysfunctional families**—families that do not meet children's needs and which in fact may do them serious harm (Amato, 1990; McKenry, Kotch, & Browne, 1991). Some dysfunctional families are neglectful of or even mistreat children. For example, consider what life is like for adolescents growing up in homes where one or both parents abuse alcohol or other drugs. Such youngsters can only guess what normal behavior is like, since they see very little of it at home. Because their parents behave very differently when under the influence of drugs than at other times, these adolescents experience high levels of anxiety: What will happen when they return home from school and open the door? They can never tell.

Perhaps an even more disturbing form of maltreatment involves **sexual abuse**—sexual contact or activities forced on children or adolescents. Unfortunately, sexual abuse is far from rare (Kendall-Tackett, Williams, & Finkelhor, 1993); indeed, large numbers of children become the victims of such betrayal by adults every year. Sexual abuse often occurs during early childhood, but it is also an alarmingly common experience for adolescents. Obviously, it produces serious psychological harm. Common among adolescent victims of sexual abuse are depression, withdrawal, running away, substance abuse, and somatic (bodily) complaints (Morrow & Sorrell, 1989). The likelihood and magnitude of these harmful effects increase with the fre-

Blended Families: *Families resulting from remarriage, consisting of biological parents, step-parents, and biological children of one or both spouses.*

Dysfunctional Families: *Families that do not meet the needs of children and in fact do them serious harm.*

Sexual Abuse: *Sexual contact or activities forced on children or adolescents by other persons, usually adults.*

quency and duration of such abuse; when the perpetrator is a close family member such as father, mother, or sibling; and when overt force is involved (Kendall-Tackett, 1991).

Has the incidence of sexual abuse increased in recent years? Or does the rise in complaints of sexual abuse mainly reflect greater attention to this problem on the part of society and greater willingness of victims to come forward? This is a difficult question to answer, but many experts feel that because of other changes in society—including the growing number of single-parent and blended families—children and adolescents may be at greater risk for such abuse than was true in the past. Whatever the ultimate conclusions, it is clear that family maltreatment generally, and sexual abuse in particular, are very serious problems with distressing consequences for the children and adolescents who are the often helpless victims.

Adolescent Sexuality While adolescents and their parents generally agree about many issues and aspects of life, there is one topic on which they often hold strikingly different views: sex. Parents, from their perspective of greater experience—and sometimes prior pain—urge caution and restraint. Adolescents, experiencing strong sexual desire for the first time, are often tempted to throw caution to the wind and indulge. Interestingly, the size of this particular generation gap may have peaked in the late 1970s or early 1980s. More recent surveys indicate that adolescents and college students have become more conservative about several aspects of sexual behavior than in the past, while parents, on the other hand, have become *less* conservative (Gerrard, 1986; Kelley & Byrne, 1992). The shift toward greater restraint among adolescents may reflect their growing—and justified—concern with *sexually transmitted diseases*. Tens of millions of persons in the United States are infected with such illnesses as *chlamydia*, *gonorrhea*, and *herpes*, an incurable disease that produces extremely painful sores on the genitals. And millions more are carrying HIV, the virus that causes *acquired immune deficiency syndrome* (AIDS). It is not yet clear what proportion of HIV-infected persons will actually develop AIDS, but it seems likely that many of those who do will die.

Whatever the specific causes, it does appear that the gap between adolescents and their parents with respect to sexual behavior has narrowed, at least to a degree. Another aspect of adolescent sexuality, however, is far less encouraging. In the United States and many other countries, rates of single motherhood have increased substantially in recent decades. Approximately 25 percent of all live births in the United States in recent years have been to single mothers (U.S. Bureau of the Census, 1991). Moreover, a growing proportion of these unmarried mothers are teenagers, many only thirteen or fourteen years old. Given the severe disadvantages faced by children born to mothers who are themselves only adolescents, these are disturbing statistics indeed. It can only be hoped that they will be reversed in the years ahead through the adoption of appropriate preventive programs (Jaccard, 1992).

That large numbers of adolescents are at considerable risk for psychological or even physical harm is obvious. Yet despite the adverse conditions under which they grow up, many of these youngsters avoid potential harm and go on to lead healthy, rewarding lives. How do they do it? This key question is being investigated in much ongoing research. For information on this work and its initial conclusions, see the **Point of It All** section.

Key Points

- Today's adolescents face many conditions that threaten their psychological and physical well-being. Many grow up in single-parent families, others are raised in blended families, and still others grow up in dysfunctional families.
- Today, large numbers of adolescents are sexually active. Negative consequences of this increased sexual activity include teen pregnancies and the spread of AIDS and other sexually transmitted diseases.

The Point of It All

Overcoming the Odds: Adolescents in High-Risk Environments

High-Risk Environment: Northern Ireland

Despite the fact that millions of children around the world grow up in disadvantaged environments like this one in Northern Ireland, most of them grow up to be productive, law-abiding members of society. Psychologists are attempting to identify the factors that help such children overcome these tremendous early disadvantages.

Imagine what it would be like to grow up in an environment like the one shown in the photo. Further, keep in mind that you would be desperately poor, might never have seen your father, and attended schools where teachers spent as much time trying to maintain order and prevent aggressive outbursts as they did teaching; that the sounds you heard at night regularly included gunshots; and that the local heroes in your neighborhood were people whose reputations rested largely on the violent acts they had committed. What kind of person would you become? There seems to be every conceivable reason for predicting that, adapting to and mirroring your surroundings, you would choose a lifestyle similar to the one you saw all around you. Yet this is not the case. Despite their exposure to such devastating conditions, large majorities of African Americans and other minority groups become law-abiding citizens who hold regular jobs and are responsible spouses and parents (Taylor, 1991). Why is this the case? In other words, what factors permit so many youngsters growing up in shattered inner-city neighborhoods to overcome the disadvantages of their background and become well-adjusted, productive persons?

This important question has recently come sharply into focus in the field of developmental psychology (Jessor, 1993). And although systematic research has only just begun, important conclusions have already begun to emerge.

First, it seems clear that families themselves adopt and use various strategies to protect their adolescents from the risks of living in high-risk neighborhoods (Furstenberg, in press). These strategies include, for example, negotiating with schools or police when their children get into trouble; seeking out resources for their children from community sponsored health-care facilities and other organizations; carefully monitoring their children's behavior to provide support against drug use and other dangerous behaviors modeled by friends and peers; and seeking out safer niches for their children, such as parochial schools, when neighborhood schools become too dangerous.

Other research shows that parents often work with teachers and schools to establish supportive classroom climates. Parents also recognize the importance of teamwork between school and home in promoting healthy development (Anson et al., 1991). In other words, some parents in threatened neighborhoods actively cooperate with neighborhood schools to make sure that positive behaviors are encouraged in both settings, and that the messages youngsters hear in one setting are echoed in the other. The basic framework underlying this work is a view of adolescents as at the center of intersecting influences from family, schools, and neighborhoods. Thus, maximum benefits will be obtained when the three factors operate in the same direction.

Again, research designed to identify the factors that help adolescents from disadvantaged backgrounds overcome their problems is very recent (Jessor, 1993). However, it has already helped to counter the view that children raised in difficult environments are doomed to failure and despair. On the contrary, studies completed to date or currently under way point to a much more optimistic conclusion: Given even half a chance, human beings can—and often do—rise above conditions that seemed designed to crush and maim their spirit.

ADULTHOOD AND AGING

If you live for an average number of years, you will spend more than 70 percent of your life as an adult. For this reason, it is important to consider the nature and scope of the changes that occur during our adult years. This section, therefore, will focus on key aspects of adult development. Specifically, we'll examine important aspects of physical, cognitive, and social change during our adult years. Before turning to specific changes, however, let's pause briefly to consider two contrasting views concerning the nature of adult development—views that attribute such change to sharply different factors.

CONTRASTING VIEWS OF ADULT DEVELOPMENT: *Internal Crises or External Life Events?*

The driving mechanism behind change during adulthood has been the subject of considerable debate. On the simplest level, it is possible to argue that we change primarily as a function of the process of living. Small adjustments in response to the everyday events of life may, over time, cumulate into major change. While this suggestion seems reasonable, psychologists who have studied adult development have often adopted one of two other perspectives on adult development. These are sometimes described as the *crisis* (or *stage*) *approach* and the *life-event* (or *timing-of-life-events*) *models*.

THE CRISIS APPROACH: ERIKSON'S THEORY REVISITED We have already reviewed what is certainly the most famous crisis-oriented theory of adult development, the one proposed by Erik Erikson. As you will recall, Erikson (1950, 1987) proposed that development proceeds through a series of distinct stages, each defined by a specific crisis. These crises, in turn, result from the fact that as individuals grow older, they confront new combinations of biological drives and societal demands. The biological drives reflect individual growth and physical change, while the societal demands reflect the expectations and requirements of society for people at different ages. During adulthood, Erikson suggested, we pass through three major crises.

Describing the first of these as the crisis of *intimacy versus isolation*, Erikson referred to the fact that during late adolescence and early adulthood, individuals must develop the ability to form deep, intimate relationships with others. This does not mean mere sexual intimacy; rather, it involves the ability to form deep emotional attachments to others. In short, this first crisis of adult life centers around the capacity to *love*—to care deeply and consistently for others. People who fail to resolve it successfully will live their lives in isolation, unable to form truly intimate, lasting relationships.

Erikson called the second crisis of adult life the crisis of *generativity versus self-absorption:* the need for individuals to overcome selfish, self-centered concerns and to take an active interest in helping and guiding the next generation. For parents, such activities are focused on their children. After the children have grown, however, the tendency toward generativity may involve serving as a *mentor*, or guide, for members of the younger generation, helping them in their careers and lives. People who do not become parents can express generativity by providing help and guidance to young people—students, younger coworkers, nieces, nephews, and so on. Individuals who successfully resolve this crisis and turn away from total absorption with their

own lives, health, and careers discover new meaning. People who do not resolve this crisis, in contrast, become absorbed in their own lives and gradually cut themselves off from an important source of growth and satisfaction.

Erikson termed the final crisis of adult development *integrity versus despair.* As people reach the last decades of life, it is natural for them to look back and to ask, "Did my life have meaning?" "Did my being here really matter?" If they are able to answer affirmatively and to feel that they reached many of their goals and made positive contributions to society and others, they attain a sense of *integrity.* If, instead, they find their lives to be lacking on such dimensions, they may experience intense feelings of *despair.* As we'll see below, successful resolution of this final crisis can have important effects on how individuals come to terms with their own mortality—the inevitable fact of death—and on their psychological and physical health during the final decades of life.

In sum, according to Erikson and others who view adult development in terms of discrete phases or stages, the major force behind change is a series of crises or transitions we face as we mature and grow older. The way in which we deal with these important turning points then determines the course and nature of our future lives.

Life-Event Models: Change in Response to the Occurrence and the Timing of Key Events A sharply different perspective on adult development is offered by *life-event* (or *timing-of-life-events) models.* These models suggest that people change and develop in response to specific events in their lives and to the times at which these occur. During childhood and even adolescence, such theories acknowledge, development does occur largely in accordance with a built-in *biological clock.* During our adult years, however, development occurs in response to important life events such as graduation from school, beginning a career, marriage, parenthood, promotions, divorce, and retirement. Thus, development becomes tied much more closely to a *social clock* than to a biological one.

Several life-event models divide important occurrences into two categories: events that are expected, or *normative,* and ones that are unexpected, or *nonnormative* (Neugarten, 1979, 1987). Normative events include graduation from school, marriage, parenthood during the early adult years, and retirement in later life. Nonnormative events include divorce, traumatic accidents, the sudden death of loved ones, and unexpected loss of a long-term job or position. Needless to say, normative events, although of crucial importance, are generally less stressful and less disruptive than nonnormative ones. The timing of life events, too, is very important (Neugarten, 1987). Most people in a given society expect certain life events to occur during specific periods. For example, in the United States, graduation from college and marriage are expected to take place when people are in their twenties; widow- or widowerhood is expected to come much later. If these events actually occur at times other than those that are anticipated, they are out of phase with society's social clock, so the people who experience them may be unprepared for the transitions they bring.

In sum, two contrasting perspectives about development during our adult years hold, respectively, that (1) such change occurs in response to a series of internal conflicts or crises, or (2) it occurs in response to specific life events and the timing of these events. Is either of these views more accurate than the other? As I explained in chapter 8, *stage theories* have generally fallen out of favor in psychology; so many psychologists currently reject the idea that all persons experience various crises in a predetermined order. For this reason, many experts in adult development tend to favor a life-event approach.

However, we do seem to be concerned with different tasks at different points in our lives, so Erikson's approach, too, offers useful insights into the continuing process of change. The two perspectives, then, should not be viewed as necessarily contradictory. Both can add to our understanding of the complex pattern of changes during our adult years.

Physical Change during Our Adult Years

Looking through a family photo album—one that spans several decades—can be a very revealing experience. There, staring out at you with youthful faces that are sometimes impossible to recognize, are your grandparents, parents, aunts, and uncles. When you compare their appearance in the photos with their appearance today, the scope of the physical changes that occur during the adult years comes sharply into focus.

Physical Change during Early Adulthood Physical growth is usually complete by the time people leave their teens, but for some parts of the body, the process of aging actually begins long before this time. For example, the lenses in our eyes begin to lose flexibility by the time we are only twelve or thirteen years old; and for some people, the tissues supporting their teeth have already begun to recede and weaken even before they have attained full physical maturity. So aging, like growth, is a continuous process that starts very early in life.

Like many biological processes, however, physical change occurs slowly at first but then proceeds more rapidly in later decades. Muscular strength, reaction time, sensory acuity, and heart action and output are all at or near their peaks through the mid-twenties, and then decline only slowly—usually imperceptibly—through the mid-thirties. Many members of both sexes do experience considerable weight gain during early adulthood, and some men undergo significant hair loss. However, by and large, physical change is both slow and minimal during this period of life.

Physical Change during Midlife By the time they are in their forties, most people are all too aware of the age-related changes occurring within their bodies. *Cardiac output*, the amount of blood pumped by the heart, decreases noticeably, and the walls of the large arteries lose some degree of flexibility. As a result, less oxygen can be delivered to working muscles within a given period of time, and even people who exercise regularly

Physical Change over the Life Span

As these photos of the author at ages four, seventeen, and fifty show, we all change tremendously in appearance over the course of our lives.

become aware of some decline in this respect: They simply can't do quite as much as they once could. The performance of other major organ systems, too, declines, and an increasing number of people experience difficulties with digestion. Other changes are readily visible when middle-aged people look in the mirror: thinning and graying hair, bulges and wrinkles in place of the sleek torso and smooth skin of youth. Huge individual differences exist in the rate at which such changes occur, however. Thus, while some persons in their forties and fifties closely match common stereotypes concerning middle age, others retain much of their youthful appearance and vigor during this period of life.

Among the most dramatic changes occurring during middle adulthood is the **climacteric**—a period of several years during which the functioning of the reproductive system, and various aspects of sexual activity, change greatly. While both sexes experience the climacteric, its effects are somewhat more obvious for females, the majority of whom experience **menopause**—cessation of the menstrual cycle—in their late forties or early fifties. During menopause the ovaries stop producing estrogens, and many changes in the reproductive system occur: thinning of the vaginal walls, reduced secretion of fluids that lubricate the vagina, and so on. Since females no longer release ova, pregnancy is no longer possible. In the past, menopause was considered to be a stressful process for many women. Now, however, it is widely recognized that cultural factors play an important role in reactions to menopause and its effects. Please see the **Perspectives on Diversity** section below for a discussion of this issue.

Among men the climacteric involves reduced secretion of testosterone and reduced functioning of the *prostate gland*, which plays a role in semen formation. In many men the prostate gland becomes enlarged, and this may interfere not only with sexual functioning but with urination as well. Men often experience reduced sexual drive at this time of life; but although sperm production decreases, many men are still capable of fathering children.

Perspectives on Diversity

Menopause: The Role of Cultural Factors

The change of life—that's the phrase that Americans in past decades often used to describe menopause. And as we mentioned earlier, many people in this country viewed this change as a very stressful one. Cultural stereotypes suggested that women undergoing menopause could be expected to experience a wide range of disconcerting symptoms: hot flashes, wide swings of mood, depression, irritability, and headaches, to name only a few. Indeed, when a middle-aged woman acted in an unexpected or unusual manner, such actions were often attributed to "the change" and, as such, were viewed as somehow beyond the control of the woman in question.

Is this picture of menopause correct? In other words, is menopause purely a biological event whose effects are shared by all women around the world? A growing body of evidence indicates that this view is definitely inaccurate. While menopause certainly involves important physical changes, the way it is experienced and the effects it produces seem to be strongly influenced by cultural factors.

Revealing information on the nature and extent of such cultural factors is provided by a well-known study conducted by Datan, Antonovsky, and Moaz (1984).

Climacteric: *A period during which the functioning of the reproductive system, and various aspects of sexual activity, change greatly.*

Menopause: *Cessation of the menstrual cycle.*

CULTURE AND LIFE EXPERIENCE

Research suggests that women's reactions to menopause differ greatly across cultures. Culture has a major impact on many aspects of change during the adult years. Can you think of any examples?

These researchers took advantage of the fact that in modern Israel individuals raised in sharply different cultures now live in a single society. Would women from these diverse cultural backgrounds experience menopause in the same manner? Or would their contrasting backgrounds influence the nature and effects of the process? In order to gather evidence on this question, the researchers interviewed middle-aged Israeli women raised in five distinct cultures. The women in four of these groups were Jewish and had been reared in the following cultures: Central Europe, Turkey, Persia, and North Africa. A fifth group consisted of Moslem Arabs. These cultures differed in many respects, but could be arranged from least traditional to most traditional in the order just presented. Women from Central Europe had the fewest children and were relatively well educated. Those from Turkey had witnessed tremendous changes in their native culture during their own lifetimes. When they were young, women were veiled and polygamy was widely accepted; by the time they were middle-aged, women's roles had expanded greatly in Turkey and the veil was only a dim memory. The Persian women were generally illiterate, and most had married men chosen by their families. Those from North Africa came from an even more traditional culture. They had been married in early adolescence and had borne children throughout their adult lives. Finally, the Arab women came from the most traditional cultural of all. They too were illiterate, and virtually all had married men chosen by their families.

Did the women in these groups have different experiences during menopause? Carefully conducted interviews indicated that they did. The women from the European and Arab cultures reported the least stress and the fewest adverse symptoms. For them, menopause was just another phase of life—one to be taken readily in stride. In contrast, women in the remaining three cultures, which can be viewed as intermediate in terms of modernity or change, reported greater stress. Apparently, women from these cultures had moved away from traditional ideas concerning women's roles—for example, the view that a woman gains increased status in middle and old age. However, they had not yet accepted the wider roles and greater freedom available to women in European cultures. At the other end of the continuum, the Arab women still lived within the certainties of their traditional culture.

These findings, together with those of other research (Lonner & Malpass, 1994), indicate that cultural values and expectations strongly shape the experience of menopause. In this context as in many others, then, biology is only part of the picture and must be understood against a rich backdrop of cultural and social factors.

So far, this picture of physical change during midlife may sound discouraging: Strength, beauty, and vigor all decline during this period. But remember, while *some* physical decline is inevitable during the middle decades of life, both the magnitude and the rate of such decrements are strongly influenced by individual lifestyle. Growing evidence suggests that factors such as physical exercise, personal nutrition, and effective management of stress may be better predictors of physical vigor and health than biological age (Roskies, 1987). In other words, a fifty-year-old who exercises regularly, eats a balanced diet, avoids excessive stress, and doesn't smoke may show higher performance on a wide range of tests of physical fitness than a twenty-five-year-old who gets no exercise, lives on fast food, burns the candle at both ends, and smokes heavily. So, yes, aging is a fact of life and cannot be avoided; but no, it's not necessary to say good-bye to vigor, health, and energy in one's thirties or forties. On the contrary, to a large degree, we can maintain health and well-being much longer than was once believed—if we are willing to make the effort to do so.

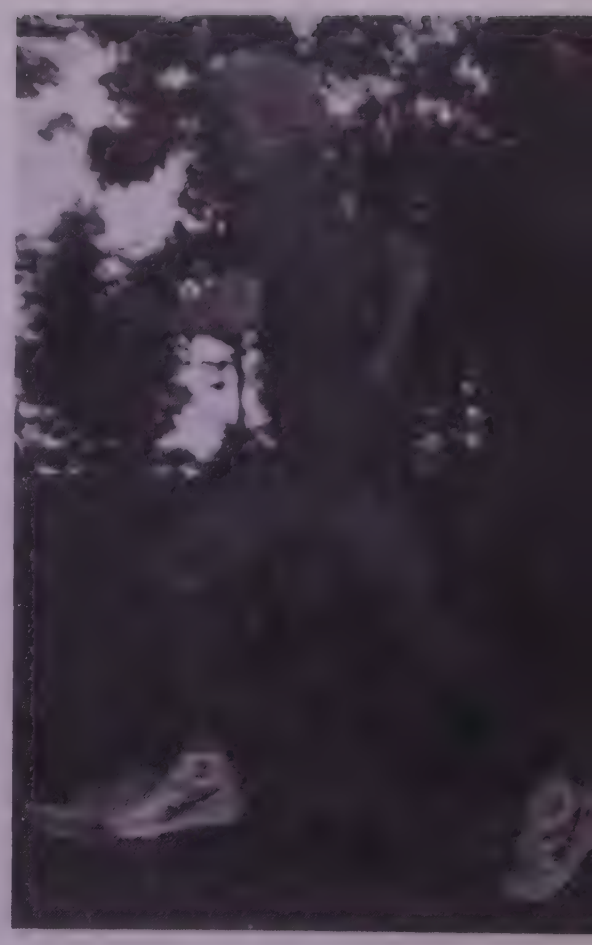
Physical Changes in Later Life Average age in many countries is currently increasing at a steady pace. In the United States, for example, the proportion of the population sixty-five or older has risen from about 4 or 5 percent in 1900 to about 12 or 13 percent now; and this figure will increase to almost 20 percent when the baby-boom generation born during the 1950s and 1960s turns sixty-five. This trend brings sharply into focus the question of physical changes during the closing decades of life, for the nature and magnitude of these changes have important implications for health-care systems and therefore for national economies generally.

What picture emerges from systematic research on physical changes in later life? A mixed but somewhat encouraging one. Stereotypes suggesting that people in their sixties, seventies, and eighties are generally frail, in poor health, and unable to take care of themselves turn out to be largely false. A large proportion of Americans in their sixties, seventies, and even eighties report excellent or good health (U.S. Department of Health and Human Services, 1989). And these are not simply overoptimistic self-reports: Growing evidence indicates that most people below the age of eighty *are* in reasonably good health and are not much more likely than middle-aged people to suffer from *chronic illnesses*—ones that are long-term, progressive, and incurable (U.S. Department of Health and Human Services, 1989). Further, even in their seventies and eighties, large majorities of people do not receive hospital care during any given year (Thomas, 1992). In short, the picture of older persons that emerges, at least in highly developed nations like the United States, is quite encouraging. There are indeed declines in physical functioning and health as people age, but these are not as large or as devastating as stereotypes of old age once suggested.

One additional—and important—point: while many physical changes do occur with increasing age, it is crucial to distinguish between those that are the result of **primary aging**—changes caused by the passage of time and, perhaps, inherited biological factors—and of **secondary aging**—changes due to disease, disuse, or abuse of our bodies. Bearing this point in mind, let's briefly examine some of the physical changes that are the result of primary aging.

Several of these involve decrements in *sensory abilities*. As people age, and especially beyond midlife, they experience declines with respect to vision, hearing, smell, taste, and other senses. *Visual acuity*, as measured by the ability to read letters on a standard eye examination chart, drops off sharply after age seventy; many people experience such changes as slower *dark adaptation* and reduced ability to notice moving targets, such as cars on a highway (Long & Crambert, 1990). Similarly, auditory sensitivity decreases with age, especially among persons who have worked in noisy environments (Corso, 1977). Declines also occur in abilities to identify specific tastes and aromas, although these do not become noticeable until after age seventy-five (Spence, 1989). There is also a general slowing in reflexes and in responses in general, so *reaction time* increases with age (Spirduso & Macrae, 1990). However, there are large individual differences; a specific seventy-year-old may still respond more quickly than a specific thirty-year-old.

Many of these changes have important practical implications, especially with respect to driving, where good vision and fast reaction time are often essential. Consider the following fact: Accident rates increase sharply for drivers above the age of seventy (see Figure 9.1 on page 354) (Cerelli, 1989). Further, when elderly drivers receive citations for traffic violations, these are more often for failing to obey traffic signs and failing to yield the right-of-way than is true of younger drivers (Stearns et al., 1985). So there is considerable evidence that declining sensory abilities increase the likelihood that older people will be a danger to themselves or to other drivers.



Slowing the Pace of Physical Change

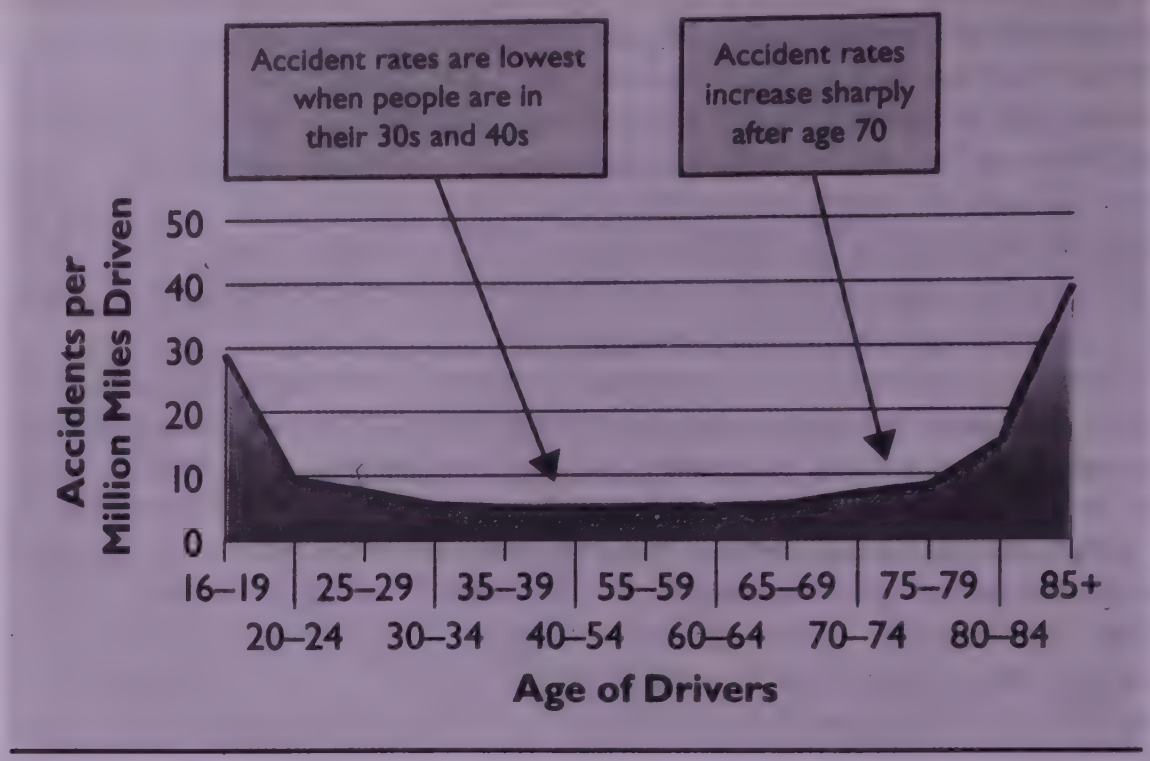
Physical change during our adult years is a fact of life. By remaining fit, however, we can slow this process greatly and reduce many of its adverse effects.

Primary Aging: *Aging due to the passage of time and, to some extent, inherited biological factors.*

Secondary Aging: *Aging due to the effects of disease, disuse, or abuse of the body.*

Age and Automobile Accidents

Older drivers—those above the age of seventy—have a higher rate of accidents than drivers in their thirties, forties, and fifties. Only young drivers below the age of twenty experience higher accident rates. (*Source:* Based on data from Cerrelli, 1989.)



I have personal experience with this fact every time I drive with my father, who is over seventy-five. While he was once an excellent driver, his driving skills are definitely not what they used to be. His night vision is poor, so he no longer drives after dark. And his reflexes have slowed to the point where he no longer avoids large potholes in the road: He drives *into* them rather than around them! Does this mean that my father and other older persons above a specific age should be kept off the roads? Statistically, this may make sense, but what about the loss in independence and self-sufficiency this would involve? And such a policy would ignore large individual differences in the aging process. While some persons in their seventies and eighties are in fact a menace on the roads, others are still safe and competent drivers.

Perhaps, then, the best course of action would be to institute more thorough testing for drivers above age sixty-five who wish to renew their licenses. At present such testing consists primarily of a simple test of visual acuity. Adding tests of hearing, reaction time, and the ability to detect motion would help differentiate persons who are still fully capable of safe driving from those whose driving should be restricted. Further, such testing would not necessarily result in a "Yes, you can continue driving" or "No, you cannot continue driving" decision. Rather, intermediate steps could be taken. For example, older drivers could be certified only for daytime driving or for driving within fifty miles of their homes. In this way, a good balance might be struck between the rights and welfare of older drivers and the need for improved safety on our public roads.

KEY POINTS

- Stage theories such as Erikson's suggest that we move through distinct stages or crises.
- Life-event theories view adult development as being tied to individuals' responses to important events in their lives.
- Physical change occurs relatively slowly during our early adult years but accelerates in middle adulthood.
- Both men and women experience changes in their reproductive systems during midlife; these are known as the climacteric. Women undergo menopause at this time. Reactions to menopause appear to be strongly influenced by cultural factors.
- Many physical changes occur in later life, including declines in sensory abilities.

COGNITIVE CHANGE DURING ADULTHOOD

That people change physically across the entire life span is obvious: We can readily see such changes with our own eyes. But what about *cognition?* Do adults change in this respect as well? And if so, how? It is reasonable to

expect that various aspects of our physical abilities will decline with age, but for cognitive abilities, it seems possible that change might be in the opposite direction. Practice, a growing knowledge base, and ever-richer schemas might well lead to enhanced rather than reduced cognitive performance. What does research on this topic indicate? Briefly, the answer depends on the specific aspect of cognitive functioning in question.

AGING AND MEMORY First, let's consider the impact of aging on memory. Research on *short-term memory* indicates that older people seem able to retain just as much information in this limited-capacity system as young ones (Poon & Fozard, 1980). However, when information in short-term memory must be processed—as, for example, when you try to solve *anagrams* (scrambled words) in your head—older persons sometimes perform more poorly than younger ones (Babcock & Salthouse, 1990).

Turning to long-term memory, studies suggest that young people do have an edge with respect to *recall,* but not with respect to *recognition* (Hultsch & Dixon, 1990). In other words, younger persons can more readily bring information stored in memory to mind, but don't necessarily recognize a piece of information more readily than older persons when it is presented to them. Moreover, when older persons are expert in a specific area, such differences in recall tend to disappear (Charness, 1989). Why do young adults sometimes outperform older ones with respect to recall? One possibility is that older persons experience an *encoding deficit*: When entering new information into memory, they are less likely than younger persons spontaneously to organize this information in various ways. As we saw in chapter 6, information that is organized is usually easier to remember at a later time than information that is not organized. So, all in all, it appears that as we age, our ability to enter new information into memory in efficient ways may decrease slightly, but that the capacity to bring information to mind once it has been stored remains largely unchanged (Zacks & Hasher, 1988).

The findings discussed so far derive primarily from experiments with relatively meaningless information—pairs of unrelated words, nonsense syllables, anagrams, and the like. What about memory for more meaningful information—memory in everyday life? Here, findings suggest that old people often perform as well as young ones (May, Hasher, & Stoltzfus, 1993). For example, in one revealing study, Sinnott (1986) asked persons participating in a long-term longitudinal study of aging (the Baltimore Longitudinal Study of Aging) to recall information in *intentional memory:* information that was meaningful to them and that they *wanted* to remember. This included such things as the date of their next appointment, the hours during which the hospital cafeteria served dinner, and so on. In addition, participants were asked to remember information in *incidental memory:* information that was less meaningful to them and that they had not intended to remember, such as objects on the table while they worked on various tasks. Results indicated that younger adults outperformed older ones in terms of incidental memory, but not with respect to intentional memory. In terms of recalling information that was meaningful to them and that they intended to remember, older persons did just as well as younger ones.

Other findings indicate that *prospective memory*—remembering to perform various actions—does decline with age for most people (Hultsch & Dixon, 1990). This does not appear to be true, however, for older adults who are high in verbal ability: Their prospective memory matches that of younger adults (Hartley, 1986). So, in answer to the question "Does memory decline with age?" we can reply: Existing evidence indicates that some memory abilities, such as recall of relatively meaningless information and prospective memory,

may decline with age. However, many others—especially recognition of meaningful information—show little change across the entire life span.

Memory and the effects of age-related stereotypes. Recent findings indicate that age-related declines in memory, when they occur, may reflect the operation of psychological factors as well as biological ones. In an intriguing study on this topic, Levy and Langer (1994) compared the memory performance of young and older adults in China and the United States. Because Chinese culture assigns higher status to older persons than U. S. culture does, the researchers reasoned that Chinese adults would be less subject to negative age-related stereotypes. Thus, they might perform better on various memory tests than older Americans. Results confirmed these predictions. These findings suggest that declines in memory with increasing age may stem, at least in part, from the impact of stereotypes and expectations.

Memory, aging, and circadian rhythms: A methodological point. Do you remember the discussion of circadian rhythms in chapter 4, and the distinction between morning people (larks) and night people (owls)? This dimension has an important bearing on the effects of aging on memory. For several biological reasons, as people get older, they tend to shift more and more toward being morning people: most alert and active early in the day. Because of this fact, research comparing the memory abilities of younger and older adults should take time of day into account. If participants are tested in the afternoon, younger people may have a decided edge, since many of them tend to be night people. If they are tested in the morning, older people may have an advantage.

That this is actually the case is indicated by a study conducted by May, Hasher, and Stoltzfus (1993). These researchers asked two groups—older adults ages 66 to 78 and young adults ages 18 to 20—to perform a memory task in which they first read ten stories and then tried to determine whether sentences they saw had been contained in those stories. Testing occurred early in the day, at 8:00 or 9:00 a.m., or later in the day, at 4:00 or 5:00 p.m. As you can see from Figure 9.2, results indicated that during the afternoon, young adults had a decided edge over older ones: They performed significantly better. In the morning, however, this difference disappeared. These findings indicate that research designed to investigate the effects of aging on memory should take circadian rhythms into account. Ideally, all participants should be tested at the time of day when they are functioning at peak levels. If they are tested in the afternoon or evening—times when most psychological research takes place (May et al., 1993)—any differences between them may be falsely exaggerated. As you can see once again, conducting research on human behavior is a complex task!

AGING AND PROBLEM SOLVING As we saw in chapter 7, the ability to solve problems is an important one that we use throughout life. Does problem-solving ability change with age? Many studies indicate that it does; in general, in these investigations people in their twenties and thirties outperform middle-aged and older people (Reese & Rodeheaver, 1985). This finding seems to reflect the fact that older persons adopt less efficient problem-solving strategies in some cases. For example, when shown pictures of common objects and asked to identify the one the experimenter has selected as a target, younger persons ask questions that quickly narrow the field. In contrast, older participants ask questions that eliminate only one picture at a time (Denney & Palmer, 1981). These differences in strategies do *not*, however, hold true for more practical problems—ones people might well encounter in

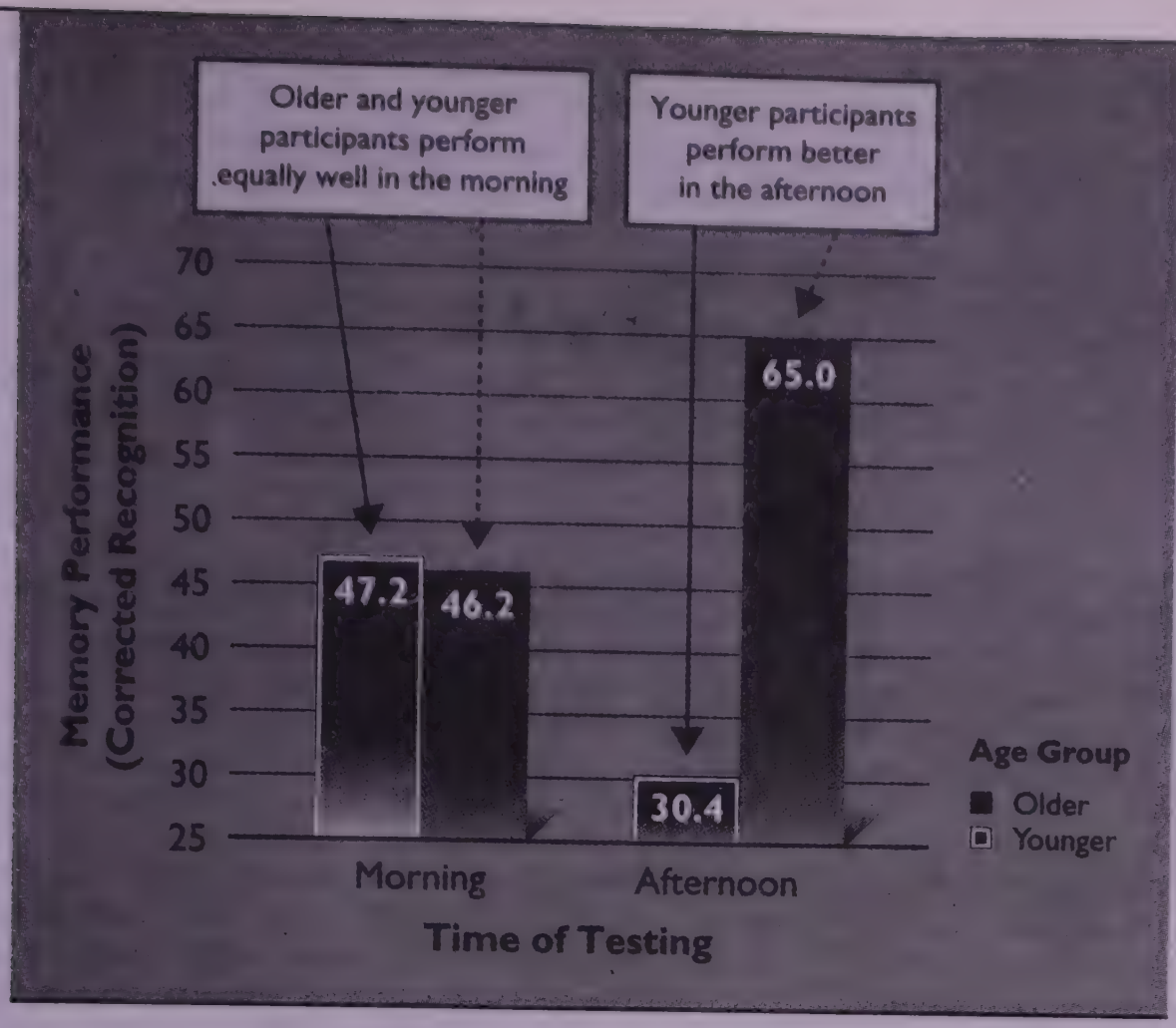


FIGURE 9.2

Circadian Rhythms and the Effects of Age on Memory

When tested in the morning—a time when they are operating at peak efficiency—persons in their sixties and seventies performed as well as much younger persons. However, when tested in the afternoon, older persons were outperformed by younger ones. These findings demonstrate the importance of taking circadian rhythms into account when investigating the impact of aging on memory. (*Source:* Based on data from May, Hasher, & Stoltzfus, 1993.)

their own lives (Cornelius & Caspi, 1987) or ones involving application of practical knowledge (Labouvie-Vief & Hakim-Larson, 1989).

Research on problem-solving ability leads us to a more general and perhaps even more intriguing question: What are the effects of age on intelligence? Please see the **Research Process** section below for a discussion of this important topic.

THE RESEARCH PROCESS

Age, Intelligence, Wisdom, and Creativity: Change or Stability across the Life Span?

Have you ever heard the old saying, "What goes up must come down"? Many psychologists once assumed that this saying applied to human intelligence. It was widely believed that intelligence increases into early adulthood, remains stable through the thirties, but then begins to decline as early as the forties. This belief was based largely on *cross-sectional research* that compared the performance of persons of different ages on standard tests of intelligence. Results indicated that in general, the older persons were, the lower their scores tended to be (Schaie, 1974; Thomas, 1992).

Unfortunately, as you know from our discussion of research methods in chapter 8, cross-sectional research suffers from a serious drawback. Differences between various groups of subjects can stem from factors other than their contrasting ages, such as differences in education or health. In order to eliminate such problems, more recent research on aging and intelligence has often employed a *longitudinal design*. In such research, the same persons are tested at several different times over a period of years to see whether there are any consistent changes in their performance. The results of studies using such procedures have yielded a more positive picture than the earlier cross-sectional studies. Instead of declining sharply with age, many intellectual abilities seem to

remain quite stable across the entire life span, showing little change into the sixties, seventies, or beyond. In fact, some abilities even seem to increase.

In what is perhaps the most extensive project of this kind, Schaie and his colleagues (Schaie, 1986, 1990, 1993), tested thousands of people ranging in age from twenty-five to eighty-one at seven-year intervals. As shown in Figure 9.3, results indicate that various components of intelligence (as measured by the Primary Mental Abilities Test, one standard test) remain remarkably stable throughout adult life. The researchers have found no reliable decrements before age sixty. A reliable average decrement appears only when people are in their seventies (see Figure 9.3). Further, even at age eighty-one, fewer than half of the persons studied show any declines during the preceding seven years. Only on tasks involving speed of reasoning do there appear to be consistent declines in performance. Since such drops in performance may reflect increased reaction time, there is little if any indication of a general decrease in intelligence with age.

While such findings are encouraging, they are not the entire story. As chapter 11 will explain, standardized intelligence tests may not capture all aspects of adult intelligence. The distinction between *crystallized* and *fluid intelligence* is especially relevant in this respect. **Crystallized intelligence** refers to those aspects of intelligence that draw on previously learned information to make decisions or solve problems. Classroom tests, vocabulary tests, and many social situations involve crystallized intelligence. In contrast, **fluid intelligence** includes the abilities to form concepts, reason, and identify similarities. Research focusing on these two types of intelligence suggests that fluid intelligence increases into the early twenties and then gradually declines. In contrast, crystallized intelligence tends to increase across the life span (Lerner, 1990; Willis & Nesselroade, 1990).

So, while there may be some declines in intelligence with age, these are smaller in both magnitude and scope than age-related stereotypes suggest.

Wisdom and Creativity: Two Other Pieces of the Puzzle

Even if there *are* some declines in intelligence with age, however, there may be other grounds for optimism concerning changes in our cognitive abilities over time. Many cultures assume that as people grow older, they gain in *wisdom*—insight and judgment about many practical matters and life problems. Thus, whatever happens to reaction time, memory, or even fluid intelligence, individuals become more valuable members of society as a result of their accumulated wisdom.

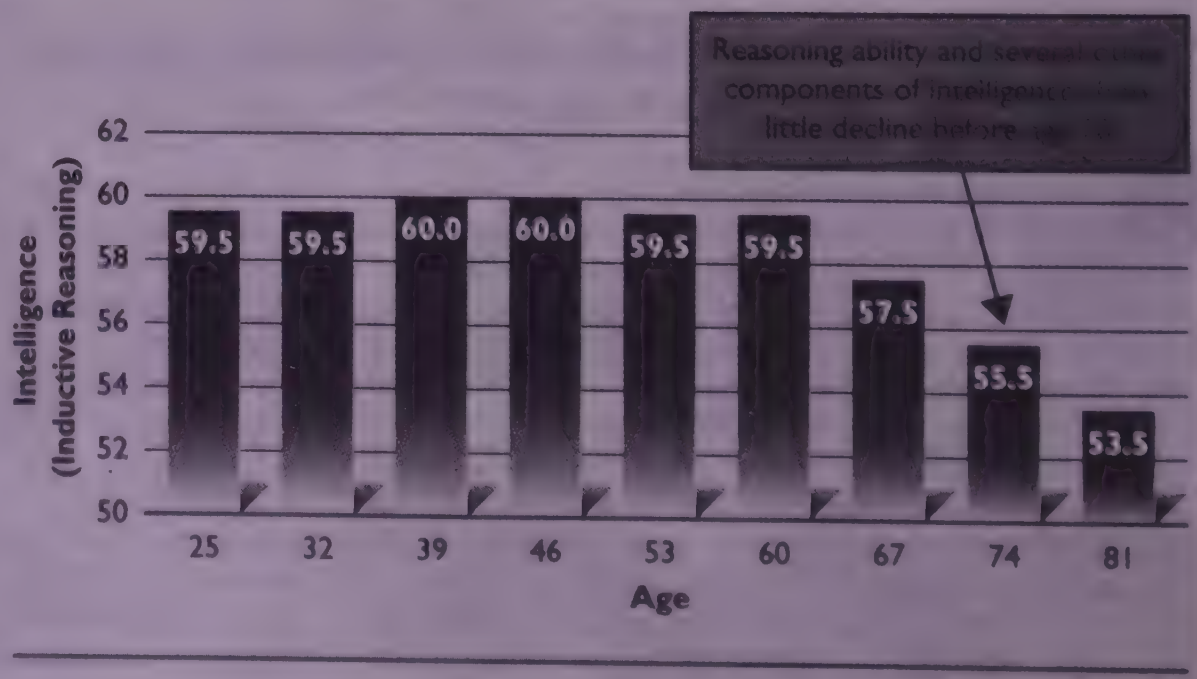
Is there any truth to such views? As yet, there is relatively little research evidence on this issue, partly because of the difficulty of finding reliable measures of wisdom. However, several studies have been conducted in which researchers present young and older adults with complex problems and ask the participants to think aloud about them. Participants' thoughts and reasoning are then rated in terms of how much wisdom they seem to show (Thomas, 1992). To date, results have been mixed, but it does appear that older persons do offer wiser solutions when the problems involve complex or unusual situations (Smith & Baltes, 1990).

Finally, what about *creativity*? Does it, too, change with age? Cross-sectional research indicates that creativity, as measured by standard tasks such as coming up with novel ways of using everyday objects, declines with age (Simonton, 1990). However, other research, focused on the question of when during their lives scientists, authors, poets, and painters make their creative contributions (e.g., Lehman, 1953), points to somewhat different conclusions (Simonton, 1990). Apparently, the

Figure 9.3

Evidence for the Relative Stability of Intelligence across the Life Span

Longitudinal research indicates that intelligence is stable across virtually the entire life span. Significant declines in components of intelligence measured by standardized tests of intelligence do not occur for most persons until they are well into their seventies. (Scores for *inductive reasoning*, one important component of intelligence, are shown here.)
(*Source:* Based on data from Schaie, 1993.)



age at which peak creativity occurs varies greatly from one field to another. While mathematicians and physicists tend to make their major contributions while in their twenties or thirties, historians, philosophers, and psychologists make theirs when they are considerably older—in their forties and fifties (Horner, Rushton, & Vernon, 1986). Further, while the number of creative accomplishments may decrease with age, their *quality* remains high.

Where does all this leave us? With, I believe, an overall pattern of evidence suggesting that very few intellectual abilities decline sharply with age. Some do indeed decrease—especially ones closely related to speed of responding. But others remain quite stable over many years, and some may actually increase as individuals gain in experience. My conclusion: we are definitely *not* doomed to experience decreasing intellectual abilities as we grow older.

Critical Thinking Questions

1. Suppose that performance on standardized tests of intelligence declined with increasing age. Would this necessarily mean that intelligence decreases as people grow older?
2. Can you offer an explanation for why crystallized intelligence increases with age while fluid intelligence decreases with age?
3. Measuring wisdom is a difficult task. Can you think of ways in which scientists might assess this quality in order to determine whether it really increases with age?
4. People acquire new information throughout life. Thus, shouldn't creativity, which involves combining information into new patterns, also increase?

Social Change in Adulthood: Tasks and Stages of Adult Life

During our adult years we engage in a wide range of activities and play many roles. Student, lover, spouse, parent, employee, boss, grandparent—these are only a few of the potential roles we occupy. As we move into various roles, and back and forth between them, these roles and the events they signify shape our lives and relations with others. For this reason, many psychologists who have studied adult development, and especially social development, have adopted frameworks that focus on these roles and the activities they involve. One such framework has been proposed by Levinson (1986).

Levinson's Stages of Adult Life Levinson divides the entire human life span into distinct *eras*, each separated from the next by a *cross-era transition*—a period in which an individual makes the change from one era to the next one. An important feature of Levinson's theory is the concept of **life structure**. This term refers to the underlying pattern of a person's life at a particular time: an evolving cognitive framework reflecting an individual's views about the nature and meaning of his or her life. Work and family are usually central to the life structure, but it may include other components as well—for example, a person's racial or ethnic background, or important external events that provide a backdrop for life, such as economic boom or depression. According to Levinson, individuals have different life structures at different times during their adult life and move from one to another through *transition periods* lasting about five years.

Levinson suggests that there are four major eras of life, each separated from the other by a transition period. These are summarized in Figure 9.4 (on page 360). As you can see, the first transition occurs between the *preadult era*, the period through adolescence, and early adulthood. Taking place between the ages of seventeen and twenty-two, this transition involves establishing one's independence, both financial and emotional. Many people pass through this transition during their college years; others accomplish it when they accept

Crystallized Intelligence: *Aspects of intelligence that draw on previously learned information to make decisions or solve problems.*

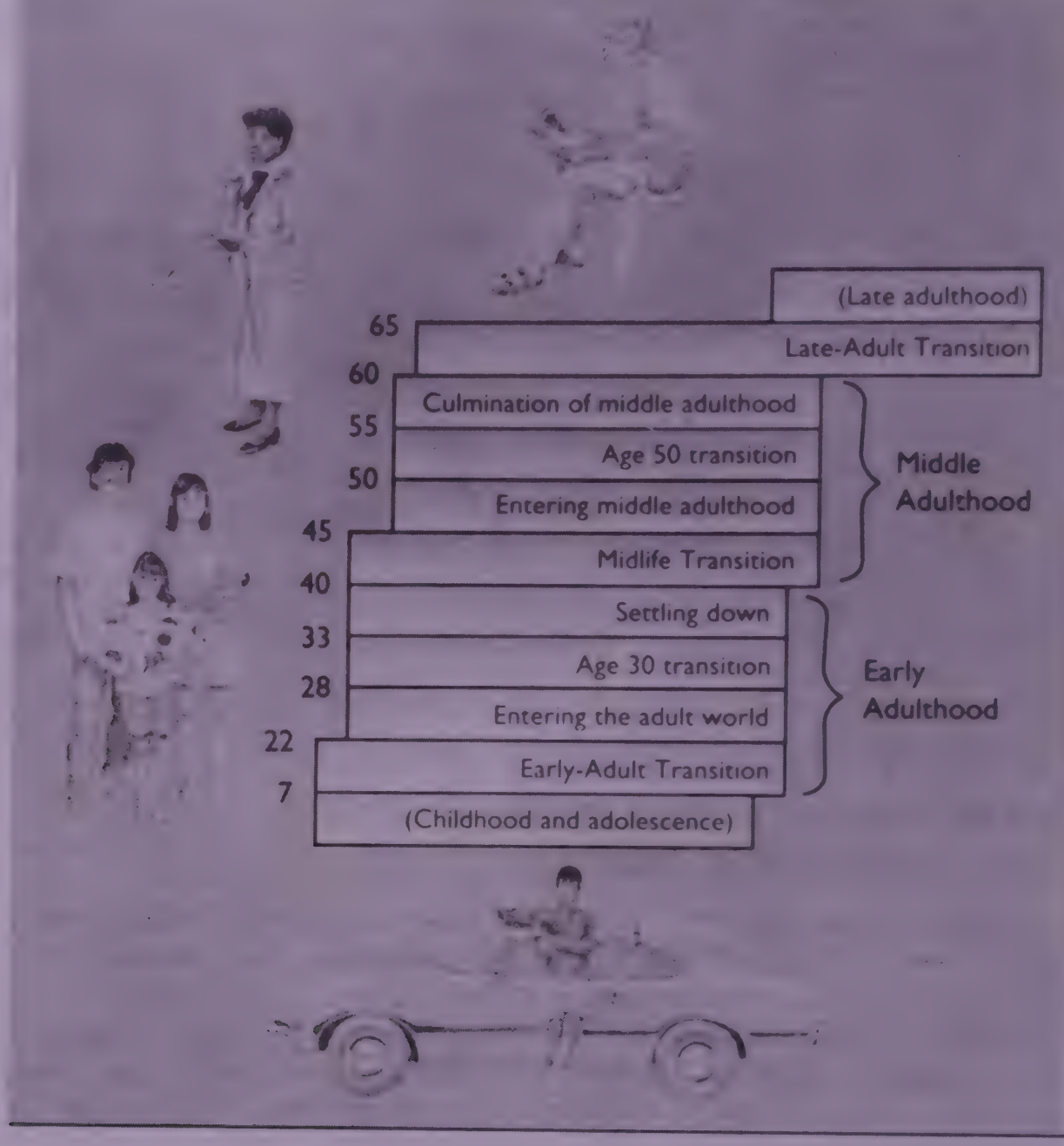
Fluid Intelligence: *Aspects of intelligence that involve forming concepts, reasoning, and identifying similarities.*

Life Structure: *In Levinson's theory of adult development, the underlying pattern or design of a person's life.*

FIGURE 9.4

Levinson's Theory of Adult Development

According to Levinson (1986), individuals move through distinct *eras* of life, each separated from the next by a turbulent *cross-era* transition period. While this theory has received a great deal of attention, its validity remains open to question.



their first job or enter military service. In either case the transition is marked by such events as establishing a separate residence and learning to live on one's own.

Once this initial transition is complete, individuals enter *early adulthood*. Two key components of their life structure at this time are what Levinson terms the **dream** and the **mentor**. The dream is a vision of future accomplishments—what a person hopes to achieve in the years ahead. Such dreams are important sources of motivation, spurring the persons who hold them to vigorous goal-directed efforts. Mentors are older and more experienced individuals who help to guide young adults. They share their wisdom and expertise with their younger protégés, aiding them with their careers. Additional crucial tasks of early adulthood include choosing an occupation and establishing a lasting relationship with a special person—someone who is central to one's life and plans.

__Dream:__ In Levinson's theory of adult development, a vision of future accomplishments.

__Mentor:__ In Levinson's theory of adult development, an older and more experienced individual who helps to guide younger adults.

__Midlife Transition:__ In Levinson's theory of adult development, a turbulent transitional period occurring between the ages of forty and forty-five.

At about age thirty, Levinson contends, many people experience what he described as the *age thirty transition*. At this time, individuals realize that they are nearing the point of no return: If they remain in their present life course, they will soon have too much invested to change. Faced with this fact, they reappraise their initial choices and either make specific changes or decide that they have indeed selected the best course.

Now, after the relative calm of the closing years of early adulthood, individuals move into another potentially turbulent transitional period—the **midlife transition**. For most people, this occurs somewhere between the ages

of forty and forty-five. It is a time when many people must come to terms for the first time with their own mortality. Up until this period, most people view themselves as "still young"—older brothers or sisters to the twenty-year-olds around them. After age forty, however, this idea becomes increasingly difficult to retain, and most people come to view themselves, at last, as the older generation. Levinson's findings suggest that for many persons this realization leads to a period of emotional turmoil. They take stock of where they have been, the success of their past choices, and the possibility of fulfilling their youthful dreams. Such reexamination leads to the formation of a new life structure—one that takes account of the individual's new position in life and may involve several new elements, such as a change in career direction, divorce and remarriage, or a redefinition of one's relationship with one's spouse. In this new life structure the individual perceives herself or himself as middle-aged, with all that this implies.

Many persons experience another period of transition between ages fifty and fifty-five, a transition in which they consider modifying their life structure once again—for example, by adopting a new role in their career or by coming to view themselves as a grandparent as well as a parent. However, this transition is often less dramatic than one that occurs somewhere between the ages of sixty and sixty-five. This **late-adult transition** marks the close of the middle years and the start of late adulthood. During this transition, individuals must come to terms with their impending retirement and the major life changes it will bring. As they move through this period of readjustment, their life structure shifts to encompass these changes. They come to see themselves as persons whose working career is over, or almost over, and who will now have much more time available to pursue hobbies and other leisure interests.

Levinson's Theory: A Critique In several respects Levinson's portrayal of development during our adult years seems to match our intuitive ideas about this process. Relatively long periods of stability are punctuated by shorter, turbulent periods in which we come to terms with changes in our goals, perspectives, and status. However, it's important to note that Levinson based his theory primarily on extensive interviews with only forty participants—all men, and all ages thirty-five to forty-five. Critics argue that this is too small and too restricted a sample on which to base such a sweeping framework (Wrightsman, 1988). In addition, of course, it is uncertain whether Levinson's suggestions apply to women as well as men; we'll return to this point below. In conclusion, then, Levinson's theory should be viewed as an interesting but as yet unverified description of social and personality development during our adult years.

Key Points

- Short-term memory does not decline with age, but recall of information from long-term memory does decline somewhat. Prospective memory, too, declines somewhat with age.
- There may be some declines in intelligence with age, but such changes are smaller and more limited in scope than was once widely believed. Some findings suggest that wisdom and creativity increase with age.
- A theory proposed by Levinson suggests that during our adult years we move through a number of distinct life eras. These are separated by turbulent transition periods.
- Throughout life, we follow an underlying pattern or design that Levinson called the life structure; this constantly evolves as we move from one era to another.

Crises of Adult Life

Levinson's theory can be viewed as a *stage theory* of adult development: It suggests that all persons pass through a series of eras and transitions. In contrast, many other researchers have focused on major *events* of adult life, and how we are affected by these. Echoing a theme we explored with respect to adolescents—risks to their well-being—we'll now focus on two events that can be viewed as major *crises* of adult life. These events are divorce and unemployment.

Late-Adult Transition: *In Levinson's theory of adult development, a transition in which individuals must come to terms with their impending retirement.*

DIVORCE Divorce rates in the United States and many other countries are at historically high levels. In fact, somewhere between a third and half of all first marriages end in divorce (Glick, 1989). Clearly, divorce is a very upsetting event for most persons. Families are shattered, a relationship that has lasted years or even decades is brought to an end, and the difficult process of adjusting to life alone must be begun. Among the major feelings experienced by divorced persons are: *anger*—relating to the conflict and bitterness leading up to the divorce, the divorce itself, and feelings of unfair treatment that may follow it; *depression*—resulting from the loss of contact with children and other family members, or from the financial consequences of divorce and the loneliness that often follows; and *disequilibrium*—feelings of being lost, aimless, and adrift resulting from severe disruption of established routines, physical relocation, and the many other changes that stem from divorce. Of course, it is also true that some divorced persons experience feelings of *relief*—because the intense conflict is behind them and they perceive a chance to have a new, perhaps better, life (Tschann, Johnston, & Wallerstein, 1989).

What are the causes of divorce? Long-term studies of couples who remain happily married and those who divorce provide revealing insights into this important question. Let's begin with the positive side of this issue: couples who report being happy in their marriage. Studies of such couples indicate that people in these relationships report that they agree with their spouses on aims, goals, and even their sex life; that they genuinely *like* their spouse and view the spouse as a good friend; that they are committed to the relationship and want it to succeed; and that they share many positive experiences with their spouse and are proud of his or her achievements (Lauer & Lauer, 1985). Additional evidence indicates that happily married couples direct a high level of positive communication to their spouse: They express affection, approval, appreciation, and pleasure, just as they did during courtship (Bradbury & Fincham, 1992). In contrast, people who report being unhappy in their marriage often adopt a negative pattern of communication. They direct mainly criticisms toward their spouse, blame him or her for anything and everything that goes wrong, and rarely express positive feelings or approval (Miller, 1991).

Couples who divorce also differ from happy ones in many other ways. First, they recognize and are disturbed by dissimilarities between them—basic disagreements about goals, lifestyles, sex, and many other matters (Levinger, 1988). Second, they report high levels of boredom in their relationship. They feel that they are in a rut and don't enjoy doing things with their spouse (Bradbury & Fincham, 1992). Third, they report that their spouses no longer fill their needs for affection, esteem, or approval (Cottrell, Eisenberg, & Speicher, 1992).

Additional factors associated with divorce include low income, a brief courtship, unrealistic expectations about the relationship, and pregnancy at the time of marriage (Kurdek, 1993). Perhaps the most surprising finding of all is that genetic factors, too, may play a role in divorce. It has long been known that people whose parents have been divorced are more likely to divorce, too, than those whose parents were not divorced (Glenn & Kramer, 1987). In general, it was assumed that this finding stemmed from the adverse effects of growing up in a divorced home—perhaps lower emotional stability and the absence of models of happy, long-term relationships. Such factors certainly play a role, but recent findings indicate that genetic factors may also be involved.

To study this possibility, McGue and Lykken (1992) compared the divorce rates of hundreds of monozygotic (identical) and dizygotic (nonidentical) twins whose parents were or were not divorced. The researchers reasoned that if monozygotic twins whose twin sibling divorced were more likely to divorce than dizygotic twins whose twin sibling divorced, this would provide evidence for a genetic contribution to divorce. As shown in Figure 9.5,

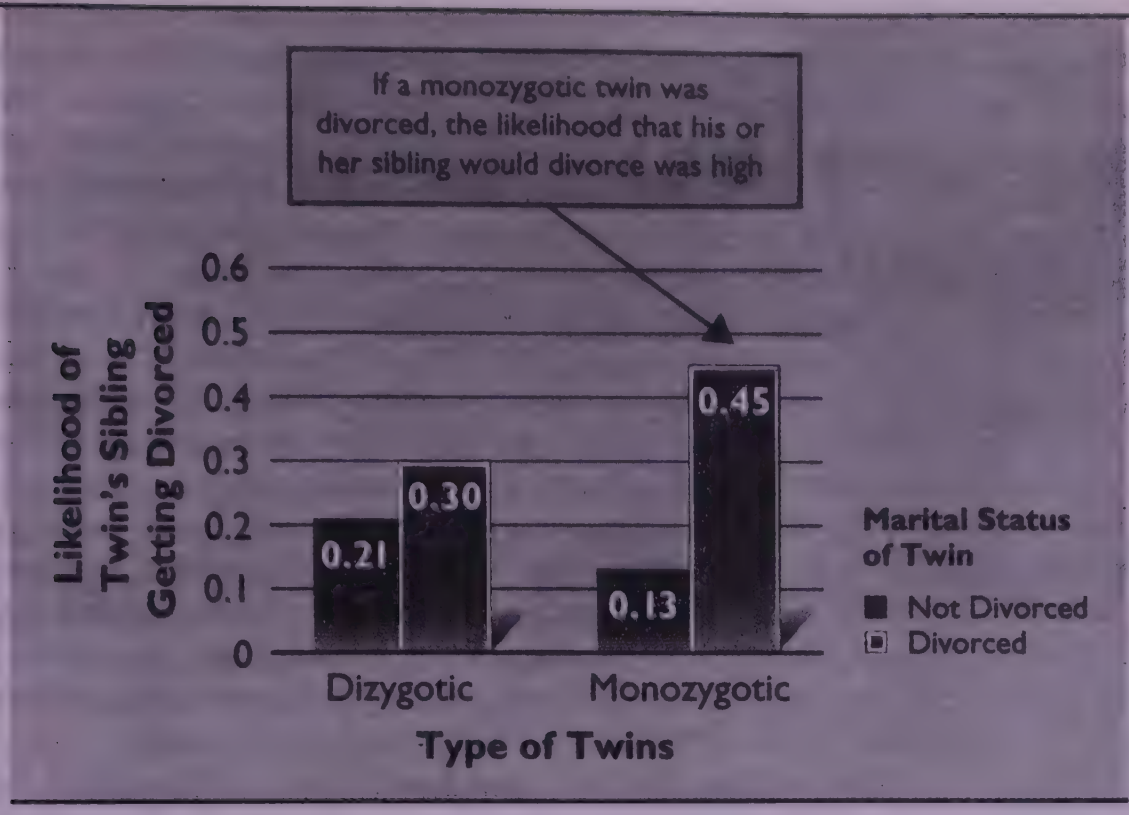


FIGURE 9.5

Evidence for the Role of Genetic Factors in Divorce

If a monozygotic twin was divorced, the likelihood that her or his twin would also be divorced was higher than if a dizygotic twin was divorced. These and other findings offer support for the view that genetic factors play some role in divorce, presumably through their influence on various aspects of personality.
(*Source:* Based on data from McGue & Lykken, 1992.)

this is precisely what was found. McGue and Lykken (1992) also found that participants were more likely to be divorced if either their own parents or their spouse's parents had been divorced. In practical terms, in this study, if a monozygotic twin's sibling, parents, and spouse's parents were all divorced, the probability of the twin divorcing was about 77.5 percent. In contrast, if neither the sibling nor the parents or parents-in-law were divorced, the probability that the twin would divorce was only 5.3 percent.

How can genetic factors influence divorce? McGue and Lykken (1992) suggest that individuals whose parents are divorced may inherit personal characteristics that make it difficult for them to maintain a long-term relationship. These specific characteristics remain to be identified, so this is only one among several possibilities. Also, it's important to realize that there is no indication in this research that environmental factors are *not* important predictors of divorce. On the contrary, such factors almost certainly play a larger role in divorce than genetic factors. Still, the findings reported by McGue and Lykken (1992) are intriguing and add a new perspective on divorce that should be carefully evaluated in future research.

UNEMPLOYMENT As I'll point out again in chapter 17, work is one of the most central activities in most people's lives. When asked "Who are you?" a large proportion of employed adults reply in terms of their job or occupation (Greenberg & Baron, 1995). Thus, it is not surprising that losing a job—or even the prospect of losing a job—is very stressful for most people (Konovsky & Brockner, 1993). Unfortunately, getting laid off is an increasingly common experience for adults in the 1990s. In the United States and elsewhere, many companies have greatly reduced the size of their workforces; as a result, the term *downsizing*—which refers to such reductions—has taken on a frightening meaning. Not only are increasing numbers of people losing their jobs; when they do, it is harder for them to find other employment. In one recent survey (Time-CNN, cited in Church, 1993), 54 percent of those responding indicated that it will be harder to find a job during the next year than it was during the preceding year, and 53 percent indicated that they expected long-term difficulties in obtaining future employment. Such fears appear well grounded: During the 1990s, American corporations alone have cut more than 500,000 people from their payrolls each year.

One new feature of this widespread loss of jobs is that for the first time since the Great Depression of the 1930s, it has fallen heavily on white-collar employees. Being unemployed is a new and devastating experience for people who formerly held excellent jobs and enjoyed numerous fringe benefits. Many of these newly unemployed are males in their forties and fifties, and because being employed is so central to their self-concept, their self-esteem is literally crushed by the experience.

Perhaps the negative effects of being unemployed are most vividly illustrated by longitudinal research in which hundreds of recent graduates from Australian schools were studied for eight years (Winefield & Tiggemann, 1991). During this period participants in the study completed questionnaires designed to measure their self-esteem, feelings of depression, negative affect, and general health. They also reported on whether they were unemployed and recorded their level of satisfaction with their current jobs. Results were clear: Unemployed individuals reported lower self-esteem, greater depression, more negative affect, and poorer personal health than those who were employed; this was especially true when unemployed participants were compared with employed persons who were satisfied with their jobs.

These and other findings indicate that losing one's job can be a highly stressful and disturbing experience—one that can threaten both physical and psychological health. Fortunately, there are steps a person can take to cope with this problem and its effects. We'll examine these in the **Making Psychology Part of Your Life** section at the end of this chapter.

Gender and the Adult Years: How Males and Females Differ

Before concluding this discussion of change during our adult years, it is important to consider another—and very crucial—issue: Are there important gender differences in this process? To put it another way, do women and men pass through the same phases of development and experience similar patterns of change? One reason for interest in this issue is that many of the theories we have discussed are based on research conducted almost entirely with males. Thus, as we noted earlier, it is unclear whether the findings of these projects can always be generalized to females. To address this issue, several researchers have conducted major studies designed to determine whether, and to what extent, males and females differ with respect to adult development.

Mastery and Pleasure among Women

In one recent study, employed women with and without children reported the highest levels of both mastery and pleasure in their lives. The group lowest on both dimensions was married women without children who were not employed outside the home.

The findings of such research (Baruch, 1984; Roberts & Newton, 1987) offer something of a mixed picture. On the one hand, it appears that in early adulthood women do confront many of the same issues and tasks as men. As Levinson suggests, they too tend to formulate a *dream* and often choose an older and wiser mentor. However, several important differences between women and men have been uncovered. First, *all* the men studied by Levinson possessed a dream, but this does not seem to be true for women. Some women have a dream centered on occupational roles and achievements, others have dreams focused on relationships to others (for example, a dream of a happy marriage), while still others do not appear to have any well-defined dream. The largest group of all had a *split dream* that included equal attention to careers and relationships (Roberts & Newton, 1987).

Additional information on possible differences between women and men with respect to adult development comes from a study by Baruch, Barnett, and their colleagues (Baruch, 1984; Baruch, Barnett, & Rivers, 1983). These researchers conducted extensive interviews with women ages thirty-five to fifty-five. Included in their sample were married women with and without children who were employed outside the home, married women with and without

children who were not employed outside the home, and divorced women with children who were employed outside the home. On the basis of the interviews, Baruch and her coworkers identified two aspects of psychological well-being for these women: *mastery*, or the extent to which the women felt in control of their own lives; and *pleasure*, the extent to which the women were happy and optimistic.

Results indicated that employed women with and without children were highest on both dimensions—a somewhat surprising finding, since working women with children might be expected to experience high levels of stress arising out of the needs to balance work and family obligations (Williams et al., 1991). Divorced working women were equally high in terms of mastery, but somewhat lower with respect to pleasure. The group lowest on both dimensions was married women without children who were not employed.

An additional finding of Baruch and Barnett's research is that in contrast to findings reported by Levinson, the women in their sample did not indicate experiencing a midlife crisis. However, other researchers have found evidence of such a transition (Harris, Ellicott, & Holmes, 1986), so the issue is currently in doubt. In any case, to judge from available evidence, it seems clear that men and women do experience somewhat different patterns of change and growth during their adult years. Such differences should be taken carefully into account in further studies of adult development.

KEY POINTS

- Among major crises of adult life are divorce and unemployment. Happily married couples show more agreement on goals, lifestyles, and sex and communicate more praise and approval than do couples who divorce. Divorce is also related to such factors as low income, lack of commitment, and boredom. Genetic factors, too, may play a role.
- Job loss is an increasingly common experience for white-collar employees in many countries. Being unemployed can undermine individuals' psychological and physical well-being.
- While females and males show many similarities in adult development, important differences between them seem to exist. Women often have split dreams that focus on both careers and relationships. Some findings suggest that women who work outside the home experience greater well-being than women who are not employed.

AGING AND DEATH: The End of Life

Since ancient times, human beings have searched for the "Fountain of Youth"—some means of prolonging youth, and life, indefinitely. But alas, such dreams have remained only illusions; while life and health *can* be prolonged through proper diet, exercise, and reduced exposure to various sources of stress, there appears to be no way to live forever. In this section, we'll consider several questions relating to the conclusion of life: (1) What, specifically, are the causes of aging and death? (2) How do terminally ill people react to their own impending death? (3) How do survivors cope with the loss of their loved ones?

THEORIES OF AGING: Contrasting Views about Why We Grow Old

Many different views about the causes of aging have been proposed, but most fall under one of two major headings: *wear-and-tear theories* and *genetic theories*.

Wear-and-Tear Theories of Aging: *Theories suggesting that aging results from continuous use of cells and organs within our bodies.*

WEAR-AND-TEAR THEORIES OF AGING The first group, **wear-and-tear theories of aging**, suggest that we grow old because various parts of our bodies, or the cells of which they are composed, wear out. One such theory emphasizes the role of *free radicals*—atoms that are unstable because they have lost electrons. According to the theory, these highly unstable particles are contin-

uously produced by body metabolism; and once formed, they react violently with other molecules in cells, thus producing damage. When this damage affects DNA, free radicals can interfere with basic aspects of cell maintenance and repair. The free-radicals theory proposes that this damage cumulates over time, thus producing the declines in biological functioning associated with aging. Other wear-and-tear theories focus on different mechanisms, but the outcome—cumulative damage to cells and organs—is much the same.

Indirect evidence for wear-and-tear theories of aging is provided by individuals who repeatedly expose their bodies to harmful conditions and substances; for example, large doses of alcohol, various drugs, or harsh environments. Such persons often show premature signs of aging, presumably because they have overburdened their bodies' capacity for internal repairs.

Genetic Theories A second group of theories attributes physical aging primarily to genetic programming. According to the **genetic theories of aging**, every living organism contains some kind of built-in biological clock that regulates the aging process. Such mechanisms may be located in all cells or may operate primarily in special groups of cells within the brain. Whatever their location, such biological clocks limit the number of times various cells can reproduce. Once this number has been reached, no further cell divisions occur, and decline leading to death follows. Another genetic theory, *gene mutation theory*, suggests that genetic mutations that interfere with normal cell functioning occur throughout our lives. When these mutations reach high enough levels, death results (Cristofalo, 1988).

Support for genetic theories is provided by the finding that certain cells do indeed divide only a set number of times before dying. Moreover, no environmental conditions seem capable of altering this number. Providing additional evidence is the fact that members of a given species seem to live no more than a certain amount of time, even under ideal conditions of nutrition and health.

Of the several different theories proposed to account for physical aging and death, none is supported by sufficient evidence to be viewed as conclusive in nature. The best scientific guess, therefore, is that aging is caused by several different mechanisms and results from a complex interplay between environmental and genetic factors.

Meeting Death: Facing the End of Life

What is death? The answer to this question is more complex than you might suspect. First, there are several kinds of death. *Physiological death* occurs when all physical processes that sustain life cease. *Brain death* is defined as a total absence of brain activity for at least ten minutes. *Cerebral death* means cessation of activity in the cerebral cortex. And *social death* refers to a process through which other people relinquish their relationships with the deceased (Thomas, 1992).

Second, there are complex ethical issues connected with death. Should individuals have the right to die when they choose, by asking their doctor to "pull the plug" on life-sustaining medical apparatus? Should physicians be allowed to grant such requests? Or must physicians always strive to maintain life, even when there is no hope of recovery? And if people have the right to choose, must they express their choice before they are seriously ill, in *living wills*? Finally, if they are unconscious and cannot make this decision for themselves, who *can* make it? These are difficult questions, only partly within the realm of science. I raise them here simply to remind you of the many issues relating to death as a biological and social event.

Genetic Theories of Aging: *Theories suggesting that aging results from genetic programming that regulates the aging process.*

But given that death is the inevitable end of life, another question arises: How do persons confronted with their own death react? Perhaps the most

famous investigation of this subject was conducted in the late 1960s by Elizabeth Kübler-Ross (1969). She studied terminally ill patients and, on the basis of detailed interviews with them, concluded that they pass through a series of five distinct stages.

The first stage is *denial*. In the denial phase patients refuse to believe that the end is in sight. "No, it can't be true," they seem to say. "I won't believe it." This stage is soon replaced by a second—*anger*. "Why me?" dying persons ask. "It isn't fair. Why should I die when I still want to live?" In the third stage, patients show what Kübler-Ross terms *bargaining*. They offer good behavior, prayer, or other changes in their lifestyle in exchange for a postponement of death. Unfortunately, such efforts cannot alter medical realities, so when it becomes apparent that their best offers of a deal with death have not been accepted, many dying persons enter a stage of *depression*. This may occur because they feel themselves growing weaker, or because they can see that medical efforts to help them, such as surgery, have failed.

According to Kübler-Ross, however, depression is not the final stage in the process. Rather, many people move from this to another reaction she describes as *acceptance*. At this stage dying individuals are no longer angry or depressed. Instead, they seem to accept their oncoming death with dignity, and they concentrate on saying fond farewells to important persons in their life and putting their affairs in final order.

Although these findings are both comforting and appealing, they have not been confirmed by other researchers. For example, Aronoff and Spilka (1984–1985) videotaped terminally ill patients at various points during their illness and examined their facial expressions for evidence of the five stages described by Kübler-Ross. They found an increase in sad expressions over time, but no evidence that these persons became calmer or happier as their deaths approached. Other researchers have found somewhat different patterns, such as expressions of hope throughout a terminal illness (Metzger, 1980). In view of these findings, and in light of the fact that Kübler-Ross used relatively informal methods in her research, it seems best to approach her conclusions with considerable caution. They are intriguing, and they certainly hold out the hope that many of us meet death in a composed and dignified manner. However, they cannot be viewed as valid unless they are confirmed by further careful research.

BEREAVEMENT: *Mourning the Death of Loved Ones*

My grandfather lived until he was almost ninety-three, and he was healthy and vigorous almost until the end. But one day he said something that I'll remember the rest of my life: "Bobby, it's so sad. I feel as though almost everyone I loved is gone." He was correct: By the time he died, his wife, sister, and lifelong friends had all long since passed away. So my grandfather had more than his share of *bereavement*—grieving for the loss of persons who were dear to him.

Because bereavement is an experience most adults have, it has been studied systematically by psychologists. The results of this research indicate that when grieving for a loved one, most persons experience the following reactions (Norris & Murrell, 1990). First, comes *shock*, a feeling of numbness and unreality that lasts hours or even days. This is followed by *protest* and *yearning*, as the bereaved person more clearly recognizes her or his loss and yearns for the

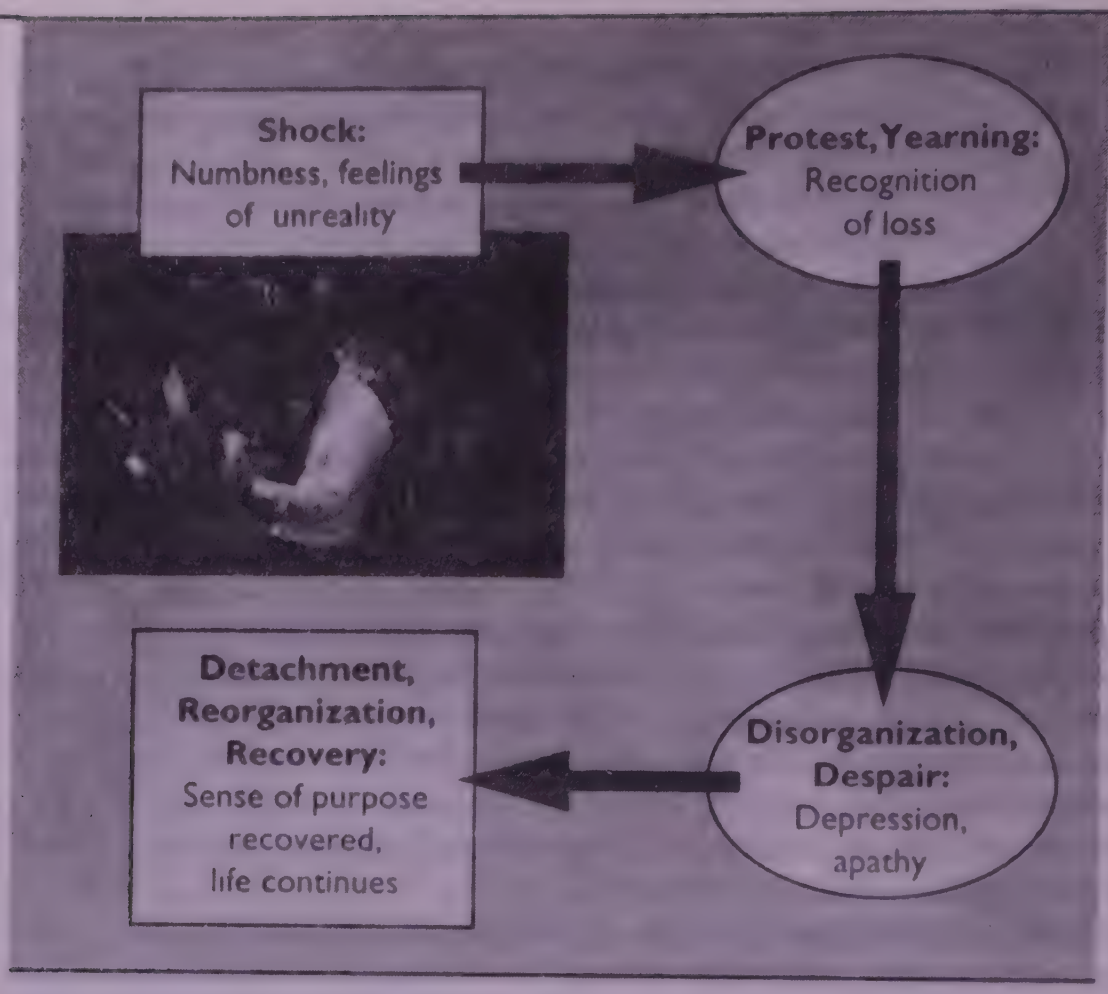
KEY POINTS

- Wear-and-tear theories of aging suggest that it results from the fact that cells or organs within our bodies wear out with continued use.
- In contrast, genetic theories suggest that we possess built-in biological clocks that limit the length of our lives.
- Research by Kübler-Ross suggests that human beings pass through five distinct stages when confronting their own death. However, these findings have not been confirmed and remain somewhat controversial.
- Bereavement involves several distinct phases, including shock; protest and yearning; disorganization and despair; and detachment, reorganization, and recovery.

FIGURE 9.6

Major Stages of Bereavement

Persons undergoing *bereavement* seem to pass through the stages of mourning shown here.



deceased person. During this phase, some persons even fantasize or hallucinate that they have seen the person they are mourning; my grandfather told me that he "saw" my grandmother many mornings when he first woke up. (They had been married sixty-four years when she died.)

A third stage, *disorganization and despair*, can last a year or more. During this stage, the mourning person may become apathetic and depressed; life does not seem worth living without the deceased. For most people, this stage is followed by *detachment*, *reorganization*, and *recovery*, as the individual establishes new roles, regains a sense of purpose in life, and psychologically picks up the pieces. Even during this stage, however, painful bouts of grieving may recur on birthdays, anniversaries, and other occasions that remind the bereaved person of his or her loss. (Figure 9.6 summarizes the major stages of bereavement.) In sum, after a prolonged period of mourning, most people do recover and go on with their lives.

Making Psychology Part of Your Life

Preparing for Tomorrow's Job Market Today

In recent years, up to 30 percent of new college graduates have either failed to find a job or finally been forced to accept one for which they were overqualified. Bellboys with BA degrees, waitresses with BS's—this is an increasingly common, and disturbing, pattern in the 1990s (Church, 1993).

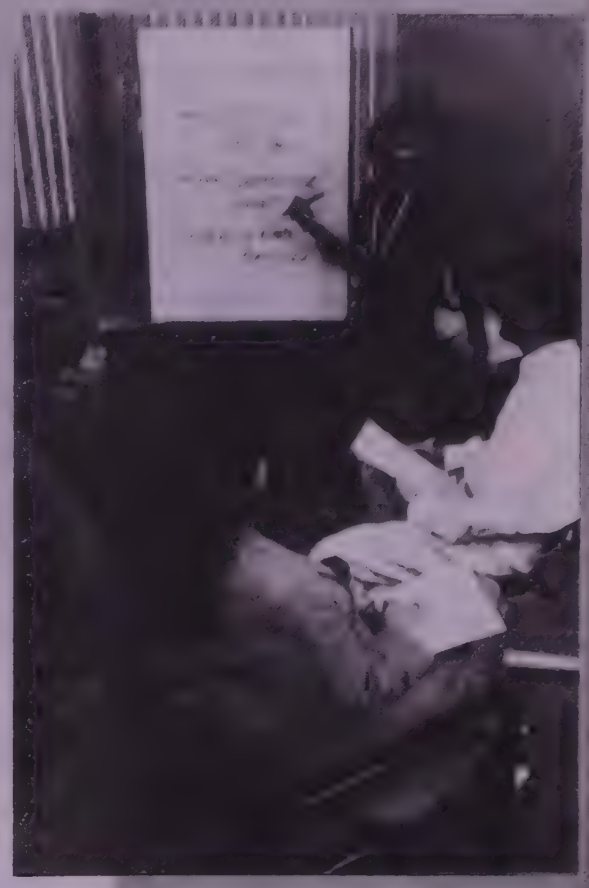
Faced with the uncertainties of today's and tomorrow's job market, are there any steps you can take to

TABLE 9.1

Careers with a Future

The careers listed here are among those expected to grow rapidly in the years ahead.

JOB/CAREER	DESCRIPTION
Information Technology	
Computer programmers	Develop new computer programs
Systems analysts	Create computer applications for specific business needs
Telecommunications managers	Specialize in the transfer of information through telephones, modems, fax machines, voice mail
Education and Training	
Employee trainers	Help people develop new skills needed to perform rapidly changing jobs
Diversity managers	Help diverse groups of employees work together effectively
Health Care	
Family physicians	Provide primary care
Nurse practitioners	Deal with a wide range of health problems
Physical therapists	Specialize in helping people recover from accidents or injuries
Business Management	
Fifty-plus marketing specialists	Promote and sell products aimed at people over fifty
Employee leasing agents	Help companies "lease" employees for specific projects (as opposed to hiring permanent help)
Managed-care experts	Help organizations deal effectively with insurance companies to obtain the best health plans for employees



increase your chances? Fortunately, there are. Several of these are summarized below. While they can't guarantee that you'll get the job you want, together they can give you an edge in an increasingly competitive economic climate (Meier, 1991).

1. *Choose a field with a future.* Echoing this chapter's theme of *change*, the job market out there is changing—and with a vengeance. This means that if you want a good job, you must choose your field carefully. Specifically, you should consider a career in areas of the economy that promise to grow rapidly in the years ahead. What are these? Recent studies of the labor market have identified fields such as the ones shown in Table 9.1.

2. *Focus on small and medium-size companies:* In the past, many graduates sought jobs with prestige companies—those with a big reputation and lots of glamour. In today's job market, this is not a good strategy, for these are precisely the companies that have announced, and executed, the largest cut-backs. Focus, instead, on smaller companies. They may not seem as glamorous, but they may be a better places to try to launch your career.

3. *Be ready to work for a foreign company.* In the United States and many other countries, multinational corporations that are expanding their operations are often the ones with the jobs. Working for a foreign company may mean that you must learn a new set of rules, because such companies often follow the home country's customary practices with respect to employees and to work. Given the continued movement toward an interconnected world economy, this is good experience and may open opportunities for you.

4. *Consider part-time or contract work as a way to get started.* Full-time jobs with large corporations are becoming harder and harder to find, partly because large companies are cutting their own staff and hiring outsiders to do many jobs. Consider starting in this manner, because often people who are hired on a part-time or contract basis gain an important advantage: they are the ones who get first shot at permanent full-time jobs when they develop.

Summary and Review of Key Points

Adolescence: Between Child and Adult

Key Terms:

adolescence, p. 336
puberty, p. 336
adolescent invulnerability, p. 339
blended families, p. 345
dysfunctional families, p. 345
sexual abuse, p. 345

- The most important feature of physical development during adolescence is puberty, a period of rapid change during which individuals reach sexual maturity and become capable of reproduction.
- Boys who undergo puberty at a relatively early age experience several advantages relative to those who mature later. For girls, the benefits of early maturity are offset by several negative factors, including envy among classmates and unwanted sexual advances from older persons.
- Research findings indicate that differences between the thinking of adolescents and that of adults are smaller in magnitude and scope than was formerly assumed. For example, adolescents do not have a greater sense of invulnerability than adults. Nevertheless, they are still more likely than adults to engage in high-risk behavior.
- According to Erikson's theory, social development involves the resolution of a series of internal crises. For adolescents the most important of these concerns establishing a clear self-identity. Adolescents try out many roles and social selves before establishing a clear self-schema.
- Today's adolescents face many conditions that threaten their psychological and physical well-being. Many grow up in single-parent or blended families. Still other adolescents are raised in dysfunctional families—ones that do not meet their needs and do them serious harm. Some are exposed to maltreatment, including sexual abuse.
- Large numbers of adolescents are sexually active. Negative consequences of this increased sexual activity include teen pregnancies and the spread of AIDS and other sexually transmitted diseases.

Adulthood and Aging

Key Terms:

climacteric, p. 351
menopause, p. 351
primary aging, p. 353
secondary aging, p. 353
crystallized intelligence, p. 359
fluid intelligence, p. 359
life structure, p. 359
dream, p. 360
mentor, p. 360
midlife transition, p. 360
late-adult transition, p. 361

- Stage theories of adult development suggest that we move through distinct stages as adults. The most famous of these is a theory proposed by Erikson suggesting that we must resolve different crises as we move through various phases of life. In contrast, life-event theories view adult development as tied to individuals' responses to important events in their lives.
- Physical change occurs slowly during our early adult years but accelerates in midlife. Both men and women experience changes in their reproductive systems during midlife; these are known as the climacteric. This process is more dramatic for women, who undergo menopause at this time. Reactions to menopause appear to be strongly influenced by cultural factors.
- Many physical changes occur in later life, including declines in sensory abilities.
- Short-term memory does not decline with age, but recall of information from long-term memory does decline somewhat. Prospective memory, too declines somewhat with age. Performance on abstract problem-solving tasks declines with age, but performance on solving real-life problems increases.
- There may be some declines in intelligence with age, but such changes are smaller and more limited in scope than was once widely believed. Some findings suggest that wisdom and creativity increase with age.
- A theory proposed by Levinson suggests that during our adult years we move through a number of distinct life eras separated from one another by turbulent transition periods.
- Throughout life, we follow an underlying pattern or design that Levinson called the life structure; this constantly evolves as we move from one era to another.

	• Among major crises of adult life are divorce and unemployment. Happily married couples show more agreement on goals, lifestyles, and sex, and the spouses communicate more praise and approval than do couples who divorce. Divorce is also related to such factors as low income, lack of commitment, and boredom. Genetic factors, too, may play a role. • Job loss is an increasingly common experience for white-collar employees in many countries. Being unemployed can undermine individuals' psychological and physical well-being. • While females and males show many similarities in adult development, important differences between them seem to exist. Women often have split dreams that focus on both careers and relationships. Some findings suggest that women who work outside the home experience greater well-being than women who are not employed.
AGING AND DEATH: THE END OF LIFE Key Terms: wear-and-tear theories of aging, p. 365 genetic theories of aging, p. 366	• Wear-and-tear theories of aging suggest that aging results from continuous use of cells and organs within our bodies. In contrast, genetic theories suggest that we possess built-in biological clocks that limit the length of our lives. Research by Kübler-Ross suggests that human beings pass through five distinct stages when confronting their own death. However, these findings have not been confirmed in subsequent research and remain controversial. • Bereavement involves several distinct phases, including shock; protest and yearning; disorganization and despair; and detachment, reorganization, and recovery.

THINKING ABOUT QUESTIONS

APPRAISAL	People change in so many ways during the course of their adult lives that some psychologists are pessimistic about ever getting a firm handle on these changes; they doubt they'll ever be able to understand them fully. Do you agree? Or do you think that systematic study of adult development can yield conclusive scientific knowledge about this important process? Support your position.
CONTROVERSY	Growing evidence indicates that children from disadvantaged backgrounds in the United States and elsewhere are being placed at tremendous risk by the environments in which they live. This has led some people to recommend massive government programs to help these children. Do you think such programs are justified? How might they be designed? In what ways could they help?
MAKING PSYCHOLOGY PART OF YOUR LIFE	On the basis of what you've learned from this chapter, what steps could you take to enhance your own physical and psychological well-being and, in this way, increase your own life span?

Motivation and Emotion

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Why are some of us *workaholics* who thrive on endless hours of effort, while others do only the bare minimum required to get by? What makes certain movie scenes, written passages, or even articles of clothing so sexually arousing? How can we tell when another person is lying? Are there subtle cues in people's voices or facial expressions that can help us in this respect? Why does the whole world seem beautiful when we are in a good mood but unappealing when we are in a bad mood? Questions about why people act and feel the way they do relate to what might be described as the "feeling" side of life, or, as psychologists would put it, to the topics of *motivation* and *emotion*.

QUESTIONS ABOUT WHY PEOPLE ACT AND FEEL THE WAY THEY DO RELATE TO WHAT MIGHT BE DESCRIBED AS THE "FEELING" SIDE OF LIFE, OR, AS PSYCHOLOGISTS WOULD PUT IT, TO THE TOPICS OF MOTIVATION AND EMOTION.

The term *motivation* refers to internal processes that serve to activate, guide, and maintain our behavior. Understanding motivation often helps us answer the question "Why?" as in "Why do other people behave as they do?" or "Why do they persist in certain courses of action, even when these don't seem to yield any obvious rewards?" Clearly, motivation is relevant to several of the questions raised above—the differences between workaholics and shirkaholics, the nature of sexual arousal, and so on (Silver, Mitchell, & Gist, in press).

Emotion, in contrast, refers to complex reactions consisting of (1) physiological responses such as changes in blood pressure and heart rate; (2) subjective cognitive states—the feelings we describe as joy, anger, sorrow, or sexual arousal; and (3) expressive reactions, such as changes in facial expressions or posture. It is on the last of these components—expressive reactions—that we often focus when trying to answer the question "Is that person telling the truth?" (DePaulo, 1992). Emotions play a crucial role in many aspects of behavior, including psychological disorders (see chapter 14). Further, as suggested by the question about why we tend to see the world through rose-colored glasses, when we are in a good mood, emotions interact with and influence many aspects of cognition (e.g., Forgas, 1991; Smith & Shaffer, 1991).

This chapter will provide you with an overview of what psychologists currently know about these two important topics. Starting with *motivation*, we'll consider contrasting theories about its basic nature. After that, we'll examine several important forms of motivation: *hunger*, *sexual motivation*, *aggression*, and motives for *achievement* and *power*. Next, we'll turn to the topic of *emotion*. Again, we'll begin by examining several theories about its nature. Then we'll turn to the physiological bases of emotion. Third, we'll consider the expression and communication of emotion—how emotional reactions are reflected in external behavior. Finally, we'll look at the complex relationship between emotion and cognition—how feelings shape thoughts and thoughts shape feelings.

MOTIVATION: The Activation and Persistence of Behavior

Consider the following events:

A group of young women and men lower themselves into a dark cave and proceed to explore it. As they do, they must squeeze through openings just barely large enough for their bodies and avoid sudden drops where the cave floor plunges away into seemingly bottomless pits. They finally reemerge into the sunlight five days later, dirty and tired but happy.

Employees of a large company remain on strike for many weeks, despite the fact that no matter how large the settlement they ultimately obtain, it will not be enough to compensate them for their lost wages and benefits.

A married couple drives almost one hundred miles over snow-covered roads in order to eat at a restaurant serving a type of food unavailable where they live.

How can such actions be explained? On the face of it, they are somewhat puzzling. Why would people risk life and limb exploring a cave, even though they can't hope to obtain any practical benefits by doing so? Why would anyone drive so far to eat a specific type of food (as my wife and I did when we lived in a very small university town more than one hundred miles from the nearest large city)? One answer is this: Such actions occur because the persons involved are *motivated* to perform them. In other words, they are responding to their own **motivation**—internal processes that can't be directly observed, but which activate, guide, and maintain their overt behaviors. Whenever the causes of a specific form of behavior can't be readily discerned in the immediate surroundings, many psychologists believe that it is reasonable to attribute them to various motives. While there is general agreement on this basic point, there has been considerable *disagreement*, over the years, about the basic nature of motivation. Let's consider some of these contrasting perspectives.

MOTIVATION: A USEFUL CONCEPT FOR UNDERSTANDING BEHAVIOR

Why do people engage in risky behaviors? One answer involves *motivation*—internal processes that can't be directly observed but that activate, guide, and maintain overt behavior.

THEORIES OF MOTIVATION: Diverse Views of a Complex Process

In psychology, before there was *motivation* there was **instinct theory**. In other words, before psychologists attempted to explain behavior in terms of motives, they sought to do so through reference to various **instincts**: innate patterns of behavior that are universal in a species, independent of experience, and elicited by specific stimuli or conditions. For a time, this approach was quite popular. William James (1890), one of the founders of American psychology, included *pugnacity*, or combativeness; *acquisitiveness*, or greed; *sympathy*; and *curiosity* on his list of basic human instincts. And Sigmund Freud suggested that many complex forms of behavior—everything from aggression to love—stem from inherited, biologically based instincts.

Do instincts really play a major role in human behavior? Most psychologists doubt that they do. Moreover, most believe that instincts are not very useful from the point of view of understanding motivation. The basic problem is this: In many cases, the existence of an instinct was inferred from the very behavior it was supposed to explain. For example, take the case of *aggression*, a form of behavior we'll consider in more detail in a later section. Why do human beings, in contrast to many other species, frequently attack others of their own kind? The answer provided by James, Freud, and many others was simple: because human beings possess a powerful aggressive instinct. So far, so good. But how do we know that they possess this instinct? Because there is so much aggression. As I'm sure you can see, this is a circular process in which an instinct is inferred from observations of behavior and is then used to *explain* the occurrence of the same behavior (see Figure 10.1 on page 376 for another example). As recognition of this basic flaw in the instinct approach increased, support for this perspective waned, and it was soon replaced by other perspectives on motivation.

Motivation: *An inferred internal process that activates, guides, and maintains behavior over time.*

Instinct Theory: *A theory of motivation suggesting that many forms of behavior stem from innate urges or tendencies.*

Instincts: *Patterns of behavior assumed to be universal in a species.*

Drive Theory: *A theory of motivation suggesting that behavior is "pushed" from within by drives stemming from basic biological needs.*

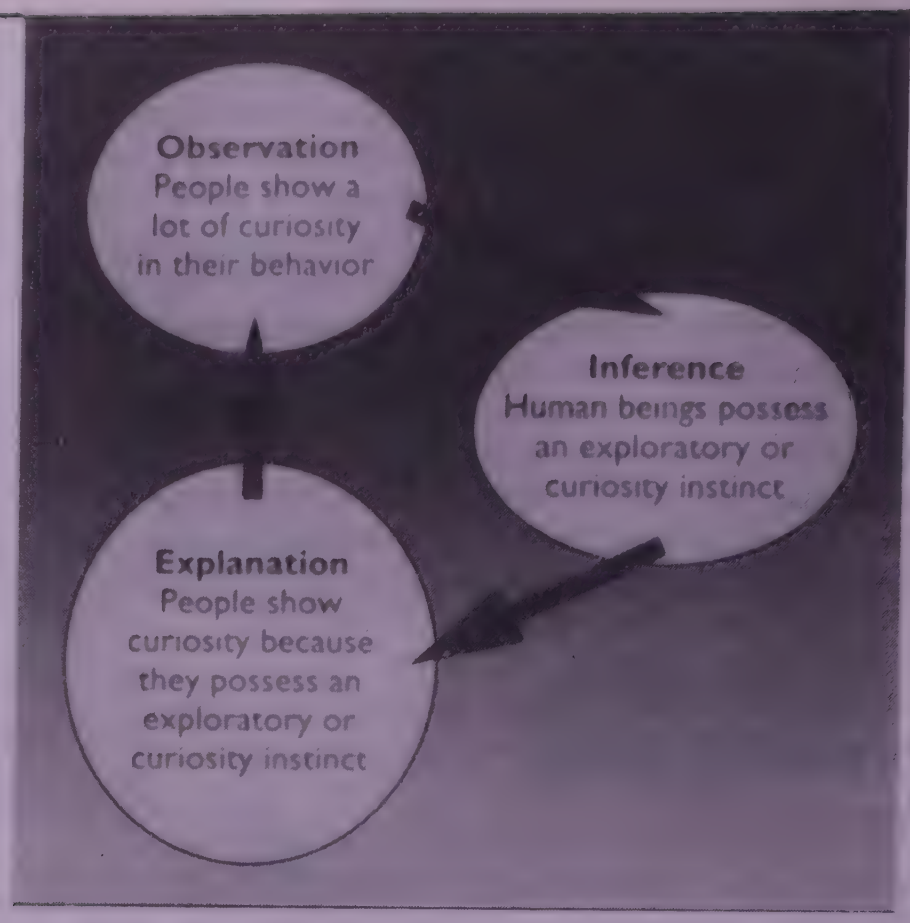
Homeostasis: *A state of physiological balance within the body.*

DRIVE THEORY: MOTIVATION AND HOMEOSTASIS What do being hungry, being thirsty, being too cold, and being too hot have in common? One answer is that they are all unpleasant and cause us to do something to eliminate such feelings. This basic fact provides the basis for a second major approach to motivation: **drive theory**. According to this theory, biological needs arising within our bodies create unpleasant states of arousal—the feelings we usually describe as hunger, thirst, fatigue, and so on. In order to eliminate such feelings and restore a balanced physiological state, known as **homeostasis**,

FIGURE 10.1

The Concept of Instinct and Circular Reasoning

In the past it was suggested that people have a curiosity instinct. This instinct was inferred from the many instances in which people demonstrated natural curiosity. Then, in a dazzling display of circular reasoning, this supposed instinct was used to *explain* the occurrence of such behavior!



we engage in certain activities. Thus, according to drive theory, motivation is basically a process in which various biological needs push (drive) us to actions designed to satisfy these needs (see Figure 10.2). Behaviors that work—ones that help reduce the appropriate drive—are strengthened and tend to be repeated. Those that fail to produce such effects are weakened and will not be repeated when the drive is present once again.

In its original form, drive theory focused primarily on biological needs and the aroused states, or drives, they produce. Soon, though, psychologists extended this model to other forms of behavior not so clearly linked to basic needs, including drives for stimulation, for status, and for wealth and power (Weiner, 1989).

Drive theory persisted in psychology for several decades; it has not been totally discarded even today. However, there is widespread agreement among psychologists that this approach suffers from several major drawbacks. The most important problem is this: Contrary to what drive theory seems to suggest, human beings often engage in actions that tend to *increase* rather than to reduce various drives. For example, people often skip snacks and let their appetites increase in order to maximize their enjoyment of a special dinner. Similarly, many persons watch or read erotic materials in order to increase their sexual excitement, even when they don't anticipate immediate sexual gratification (Kelley & Byrne, 1992). In view of such evidence, most psychologists now believe that drive theory, by itself, does not provide a comprehensive framework for understanding human motivation.

Arousal Theory: *A theory of motivation suggesting that human beings seek an optimal level of arousal, not minimal levels of arousal.*

AROUSAL THEORY: SEEKING OPTIMUM ACTIVATION When it became clear that people sometimes seek to increase rather than to decrease existing drives, an alternative theory of motivation known as **arousal theory** was formulated (Geen, Beatty, & Arkin, 1984). This theory focuses on *arousal*, our general level of activation, which is reflected in physiological measures such as heart rate or blood pressure, muscle tension, and brain activity (Brehm & Self, 1989). Arousal varies throughout the day, from low levels during sleep to much higher ones when we are performing strenuous tasks. Arousal theory sug-

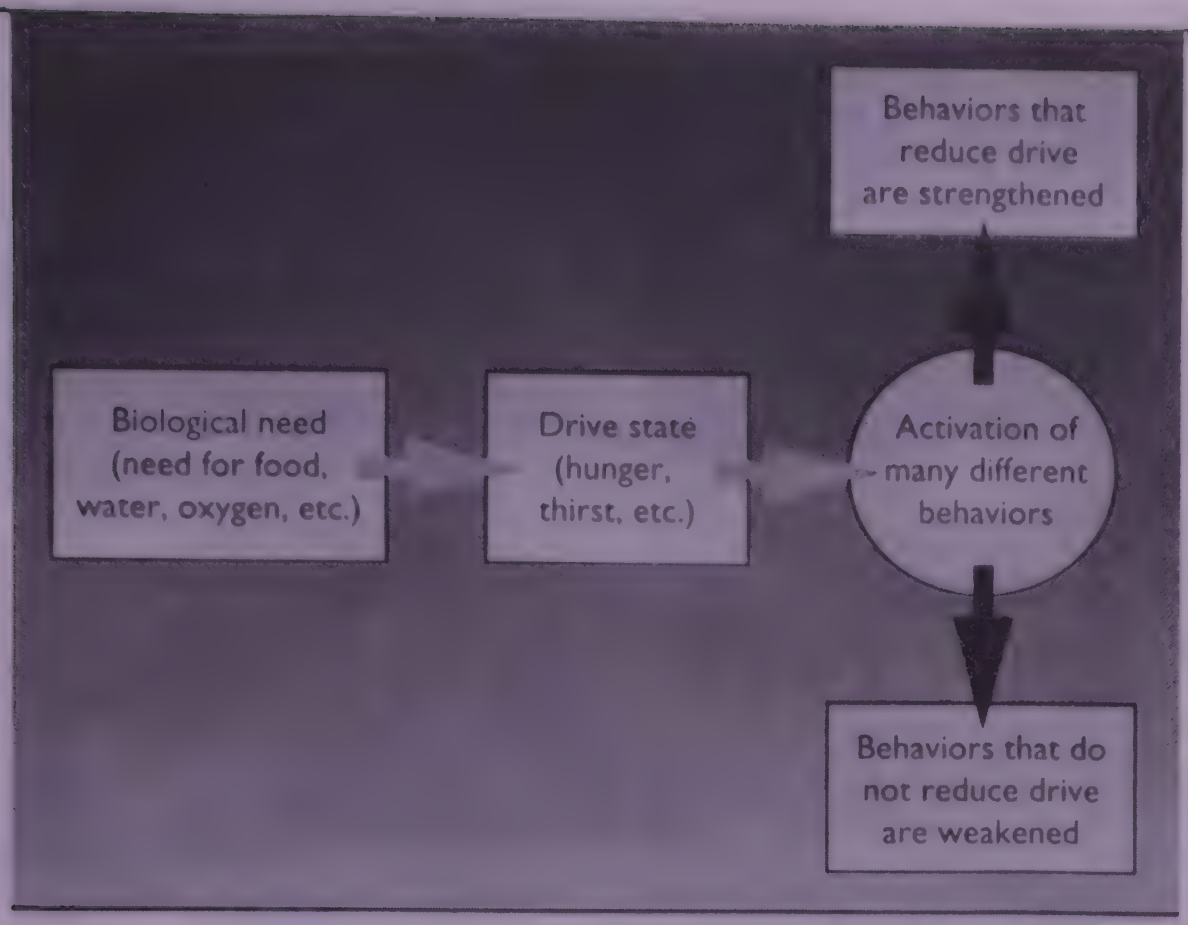


FIGURE 10.2

Drive Theory: An Overview

According to *drive theory*, biological needs lead to the arousal of appropriate *drives* which activate specific forms of behavior. Actions that satisfy (reduce) these drives are strengthened and tend to be repeated when the drive is again present. Behaviors that fail to satisfy the drives are weakened.

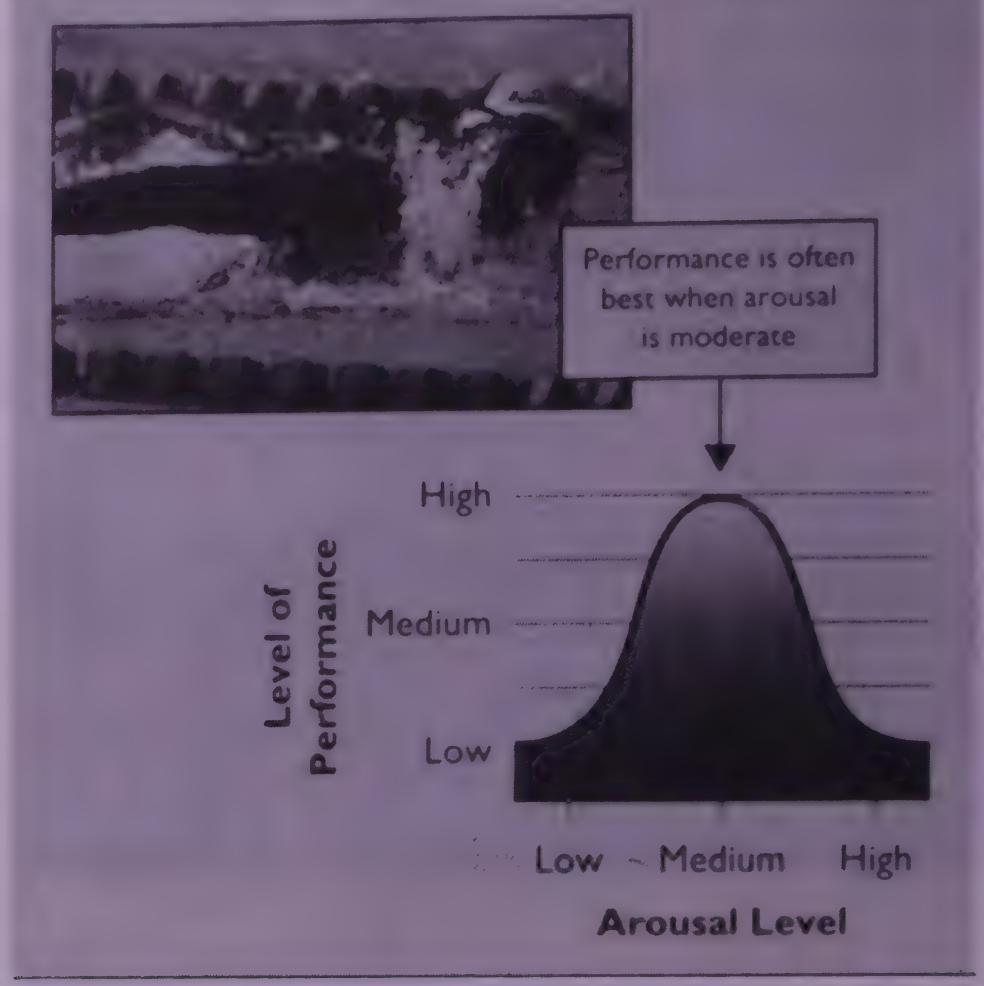
gests that what we seek is not minimal levels of arousal, but rather *optimal arousal*—a level of arousal that is best suited to our personal characteristics and whatever activity we are currently performing. So, for example, if you are listening to soothing music, a relatively low level of arousal will be optimal. If you are competing in a sports event, a much higher one will be best.

Many studies offer at least indirect support for arousal theory. For example, there *is* often a close link between arousal and performance; see Figure 10.3 (on page 378) (Weiner, 1989). However, it is often difficult to determine in advance just what level of arousal will be optimal for a given task or situation. Further, large individual differences exist with respect to preferred arousal level. At one extreme are individuals who prefer and seek high levels of activation (Zuckerman, 1990). At the other are persons who prefer much lower levels of arousal. Thus, while the theory does provide useful insights into the nature of motivation, it has important limitations, too.

EXPECTANCY THEORY: A COGNITIVE APPROACH Why are you reading this book? Not, I'd guess, in order to reduce some biologically based drive. Rather, the chances are good that you are reading it because you expect that doing so will help you to reach important goals: to gain useful and interesting knowledge, to get a higher grade on the next exam, to graduate from college. In short, your behavior is determined by your *expectancies*—by your beliefs that your present actions will yield various outcomes in the future. This basic point provides the foundation for a third major theory of motivation, **expectancy theory**. This view suggests that motivation is not primarily a matter of being pushed from within by various urges; rather, it is more a question of being *pulled* from without by expectations of attaining desired outcomes. Such outcomes, known as **incentives**, can be almost anything we have learned to value—money, status, power, the admiration of others, to name just a few. In other words, while drive theory focuses mainly on the stick in the familiar carrot-and-stick notion, expectancy theory focuses more directly on the carrot. Why do people engage in complex, effortful, or even painful behaviors such as working many hours on their jobs, performing aer-

Expectancy Theory: *A theory of motivation suggesting that behavior is elicited by expectations of desirable outcomes.*

Incentives: *Rewards individuals seek to attain.*



Arousal and Performance

Across a wide range of tasks, performance increases as arousal rises to moderate levels. Beyond some point, however, optimal levels of arousal are exceeded, and performance begins to decline.

obic exercises, or studying long into the night? Expectancy theory answers: because they believe that doing so will yield outcomes they wish to attain.

Expectancy theory has been applied to many aspects of human motivation. Perhaps, though, it has found its most important practical use with respect to **work motivation**—the tendency to expend energy and effort on one's job (Locke & Latham, 1990). Research indicates that people will work hard at their jobs only when they believe that doing so will yield outcomes they desire, such as raises in pay, promotions, or increased status. (We'll return to work motivation in more detail in chapter 17, where we'll consider some of the major findings of the field of *industrial/organizational psychology*).

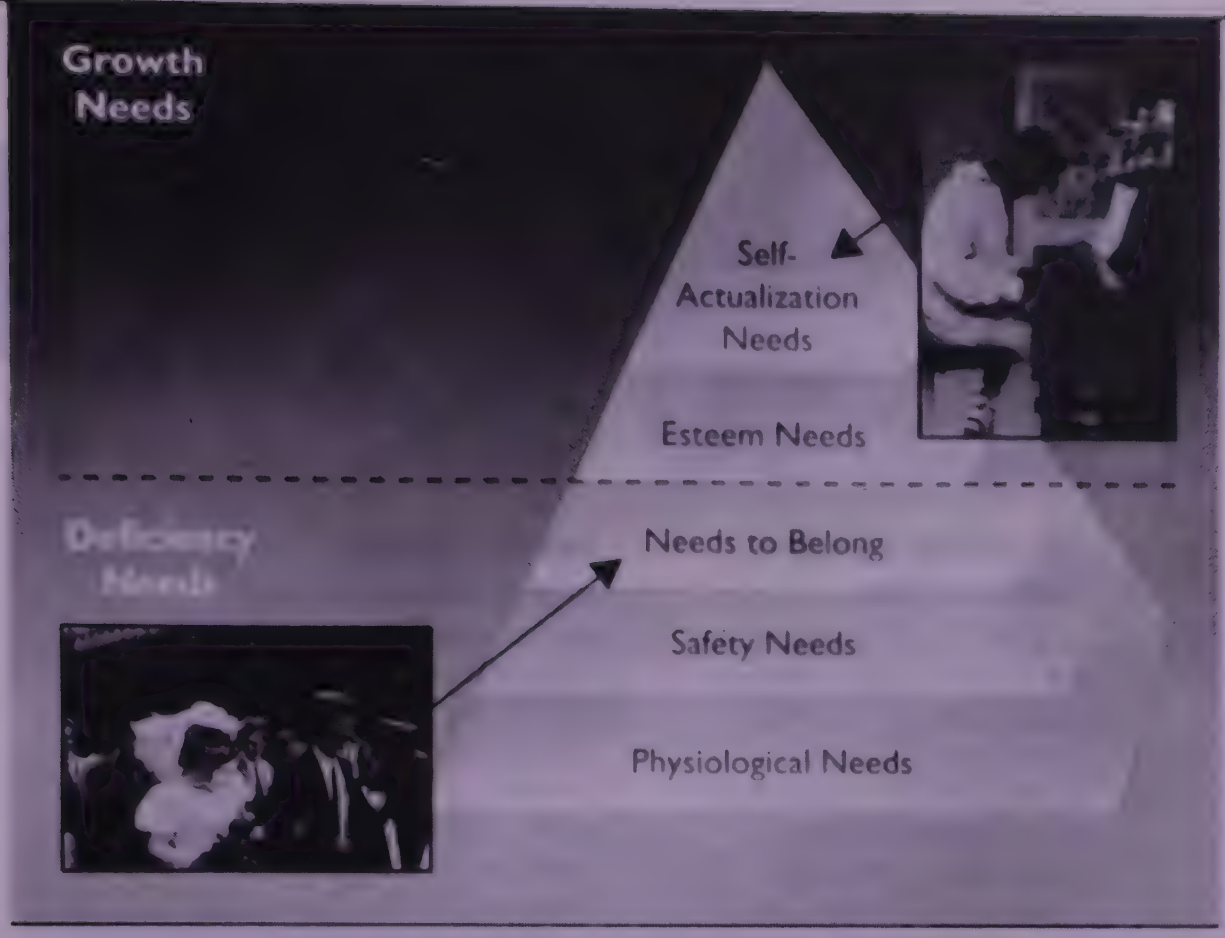
In sum, expectancy theory suggests that our motivation to engage in various activities will be high only when we expect that doing so will somehow pay off—yield outcomes or results we desire. In several respects, it is hard to imagine a more sensible statement about human motivation.

Maslow's Needs Hierarchy: Relations among Motives Before concluding this discussion of contrasting perspectives on motivation, it is important to consider one additional question: What specific motives influence behavior at any given time? One answer has been provided by Abraham Maslow (1970). He proposes that motives (or, as he puts it, *needs*) exist in a hierarchy, so that ones lying near the bottom of the hierarchy must be at least partially satisfied before those lying higher up can influence behavior. At the base of Maslow's **hierarchy of needs** are what he terms *physiological needs* such as the needs for food, water, oxygen, and sleep. One step above these are the *safety needs*, needs for feeling safe and secure in one's life. Above the safety needs are *social needs*, including needs to have friends, to be loved and appreciated, and to belong—to fit into a network of social relationships.

Work Motivation: *Motivation to perform and complete various tasks.*

Hierarchy of Needs: *In Maslow's theory of motivation, an arrangement of needs from the most basic to those at the highest levels.*

Maslow describes physiological, safety, and social needs as *deficiency needs*: They are the basics and must be satisfied before higher levels of motivation, or *growth needs*, can emerge. Above the social needs in the hierarchy are *esteem*



Maslow's Needs Hierarchy

According to Maslow (1970), needs exist in a hierarchy. Only when lower-order needs are satisfied can higher-order needs be activated.

needs, or needs to develop self-respect, gain the approval of others, and achieve success. Ambition and need for achievement, to which we'll return in a later section, are closely linked to esteem needs. Finally, at the top of the hierarchy are *self-actualization needs*. These involve the need for self-fulfillment—the desire to become all that one is capable of being. Self-actualization needs include concerns not only with one's selfish interests but also with issues that affect the well-being of others, and even of all humanity. Figure 10.4 provides an overview of Maslow's theory.

Maslow's theory is intuitively appealing, but is it accurate? Do needs exist in a hierarchy, and must lower-level needs be met before higher-level ones can have a motivating effect? Research findings on these issues paint a mixed picture. Some results suggest that growth needs do come into play only after people have satisfied lower-level deficiency needs (Betz, 1982). But other findings indicate that people sometimes seek to satisfy higher-order needs even when ones lower in the hierarchy have not been met (Williams & Page, 1989). Moreover, it appears that several needs, and motivation relating to them, can sometimes be active at once (Greenberg & Baron, 1995). So, in sum, Maslow's needs hierarchy is best viewed as an interesting but largely unverified framework.

KEY POINTS

- The concept of motivation is helpful in explaining behavior that can't readily be interpreted in terms of current conditions in a given situation.
- Drive theory proposes that motivation is basically a process in which various biological needs push (drive) us to actions designed to satisfy these needs.
- Arousal theory suggests that organisms seek optimal levels of arousal.
- Expectancy theory suggests that behavior is often motivated by expectancies concerning the outcomes that will result from specific actions.
- Maslow's needs hierarchy theory suggests that needs exist in a hierarchy and that higher-level needs cannot be activated, or serve as sources of motivation, until lower-level needs have been satisfied.

HUNGER: Regulating Our Caloric Intake

Mahatma Gandhi, one of the founders of modern India, once remarked, "Even God cannot speak to a hungry man except in terms of bread." By this

Abraham Maslow (1908–1970)

A leader of the humanistic school of thought, Maslow believed in the essential goodness of people. He organized needs and drives into a pyramidal theory, with basic physiological needs at the bottom, followed in ascending order by learned needs and culminating in self-actualization.

Judith Rodin

Rodin's work has focused on health and eating behavior, including extensive research into the causes of obesity and other eating disorders. She asserts that it is the physiological responses to hunger of obese people that distinguish them from others, not their eating habits.

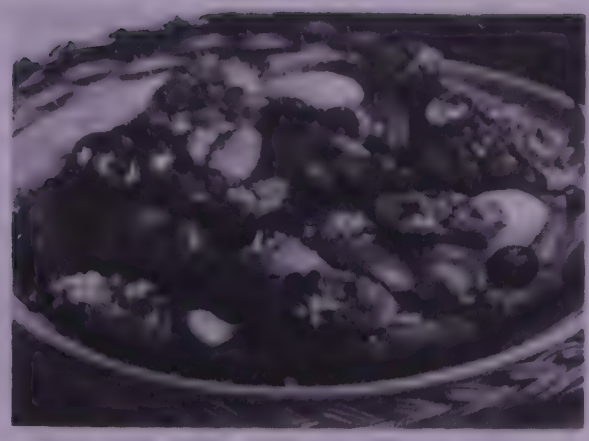
Key People in Motivation

he meant that when people are hungry, **hunger motivation**, or the urge to obtain and consume food, takes precedence over all others—a view consistent with Maslow's needs hierarchy. If you have ever had the experience of going without food for even a single day, you know from personal experience how strong and insistent feelings of hunger can be, and what a powerful source of motivation they can provide.

But where do such feelings come from? And how do we manage to regulate the amount of food we consume so that, for most persons, body weight remains fairly stable even over long periods of time? These are some of the questions psychologists have addressed in their efforts to understand the nature of hunger motivation.

The Regulation of Eating: A Complex Process Consider the following fact: If you consume just twenty extra calories each day (less than the amount in a single small carrot), you will gain about two pounds a year—twenty pounds in a decade. How do people keep caloric input and output closely balanced and so avoid such outcomes? What mechanisms allow for the long-term stability of body weight? The answer involves a complex system of regulatory mechanisms located in the hypothalamus, liver, and elsewhere. These systems contain special *detectors*, cells that respond to variations in the concentration of several nutrients in the blood. One type of

Hunger Motivation: *The motivation to obtain and consume food.*



Visual Cues Play an Important Role in Hunger

Even though you can't smell or taste the foods shown here, you would probably choose the one on the right as the more appetizing dish.

detector responds to the amount of *glucose*, or blood sugar. Other detectors respond to levels of *protein*, and especially to certain amino acids. This is why we feel full after eating a meal high in protein, such as a thick juicy steak, even though the level of glucose in our blood remains relatively low. Finally, other detectors respond to *lipids*, or fats. Again, even if glucose levels are low, when the amount of lipids circulating in the blood is high, we do not feel hungry.

Complex as all this seems, it is still only part of the picture. In addition, eating and hunger are also strongly affected by the smell and taste of food and by feedback produced by chewing and swallowing. The impact of such factors is well documented. For example, in one series of studies, volunteers wore special equipment fitted to their teeth—equipment that permitted the researchers to obtain records of their actual chewing (Stellar, 1985). Participants also reported on their feelings of hunger and on the tastiness of the foods they ate. Results confirmed what informal observation suggests about our own eating: At first, when they were very hungry, the volunteers chewed less and swallowed more often. In other words, they consumed foods quite rapidly. As they satisfied their hunger and reported that the foods were less and less tasty, however, they chewed more and swallowed less often; their rate of intake dropped.

The sight of foods is also an important factor in eating. Foods that are attractive in appearance are hard to resist; many people eat more when presented with culinary delights than when presented with more mundane forms of food. Cultural factors, too, often play a major role in determining what, when, and how much we eat. Would you happily munch on fried grasshoppers? Sea urchin? Octopus cooked in its own ink? How about snails or snake? Depending on the culture in which you have been raised, the thought of such items may induce hunger pangs or feelings of nausea. Such contrasting reactions suggest that although hunger does indeed stem from biological needs, it is strongly influenced by learning and experience, and by cognitive factors, too (Rodin, 1984). So even this seemingly basic form of motivation is more complex than you might at first guess.

Factors in Obesity: Why Some Persons Experience Difficulty in the Long-Term Regulation of Body Weight There can be little doubt that in the 1990s—at least in Western cultures—thin is in. In the United States alone, consumers spend huge sums each year on products and programs related to weight loss. What's behind this mass quest for slimness? The answer involves two powerful motives: the desire to be attractive to others and the desire to protect one's personal health. The first motive is encouraged by countless ads, movies, and television shows in which being slim is repre-

sented as an essential ingredient in physical beauty or popularity. The second motive derives from growing medical evidence indicating that being significantly overweight—a condition known as **obesity**—is indeed potentially harmful. Obesity has been linked to such serious disorders as high blood pressure, diabetes, and arthritis, to name a few (Kolata, 1985). Further, employees who are significantly overweight miss more days of work than those who are not (Goode, 1990).

Despite all this emphasis on slimness, many people experience difficulty in regulating their eating and hence their body weight. Why? Several factors seem to play a role. First, part of the problem may be learned. Many people acquire eating habits that are very likely to generate excess pounds. They learn to prefer high-calorie meals that are rich in protein and fats. Further, they learn to associate the act of eating with many different contexts and situations. If you feel a strong urge to snack every time you sit down in front if the television set or movie screen, you already know about such learning. The desire to eat can be classically conditioned (see chapter 5); that is, cues associated with eating when we are hungry can acquire the capacity to prompt eating even when we are *not* hungry.

Genetic factors, too, are important. Individuals differ greatly in terms of their *basal metabolic rate*—the number of calories their bodies require at rest within a given period of time. Persons of the same age and weight performing the same daily activities can differ widely in this regard, with the result that one person may require almost twice as many calories as the other to maintain a stable weight.

A third factor that seems to play an important role in the regulation of weight among humans involves the effects of stress. How do *you* react to stress—for example, to a big exam, a fight with your boyfriend or girlfriend, a traffic ticket? If you are like most people, your appetite probably decreases at such times. Those unpleasant feelings in the pit of your stomach make eating unattractive, at least temporarily. Overweight persons, however, often have a different reaction. They tend to eat *more* during periods of stress, even if they do not feel hungry.

Yet another factor that seems to contribute to unwanted weight gain involves an intriguing difference between people who are obese and those who are not. Several studies indicate that overweight persons respond more strongly to external cues relating to food (Rodin & Slochower, 1976). They report feeling hungrier in the presence of food-related cues—the sight or smell of foods—than nonobese people, and they find it harder to resist eating when tasty foods are available, even if they are not hungry (Rodin, 1984).

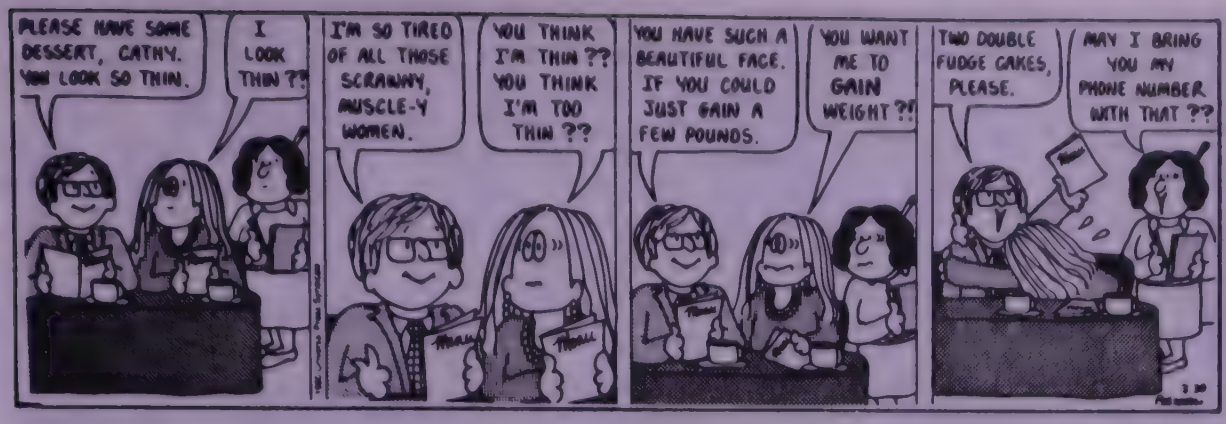
Taking all these factors together, it is not surprising that many persons experience difficulties in regulating their own weight over the long term. There are simply too many variables or conditions that, together, can overwhelm the exquisitely balanced—and extraordinarily complex—biological mechanisms that normally keep body weight stable.

Obesity: *The state of being significantly overweight.*

Anorexia Nervosa: *An eating disorder in which individuals starve themselves and often lose a dangerous amount of weight.*

Bulimia: *An eating disorder in which periods of binge eating alternate with periods of self-induced purging.*

Serious Eating Disorders: Anorexia Nervosa and Bulimia As mentioned earlier, obesity poses a threat to personal health. Even more serious, however, are two additional conditions known together as *eating disorders*: **anorexia nervosa** and **bulimia**. (We'll consider these disorders again in chapter 14.) Persons suffering from anorexia nervosa literally starve themselves, often losing a dangerous amount of weight—15 percent or more of total body weight (Thompson, 1992). Such losses of weight can be tragically serious: Up to 5 percent of females suffering from this condition die as a result of their severe weight loss and associated problems (Hsu, 1986). Anorexia nervosa occurs ten times more frequently among women than among men, and is



DOES THINNESS EQUAL SEX APPEAL?

Many men do *not* find excessive thinness in women to be attractive. Yet, many women believe that unless they are extremely thin, they will not be physically appealing. (*Source:* CATHY copyright 1990 Cathy Guisewite. Reprinted with permission of UNIVERSAL PRESS SYNDICATE. All rights reserved.)

more common among young women in their teens and twenties than among older women. There can be little doubt that this eating disorder poses a considerable danger to the health and well-being of females in many countries.

In contrast, persons suffering from *bulimia* are generally of normal or near-normal weight; they don't suffer the extreme emaciation of persons with anorexia nervosa. However, bulimia does involve dramatic disorders in eating behavior. Bulimics maintain their normal weight through drastic means. Typically, they engage in bouts of excessive or *binge* eating, then purge themselves by self-induced vomiting or use of laxatives. Again, most persons suffering from bulimia are young women in their teens or twenties (Hinz & Williamson, 1987). Obviously, this eating disorder, too, can have profound adverse effects on personal health.

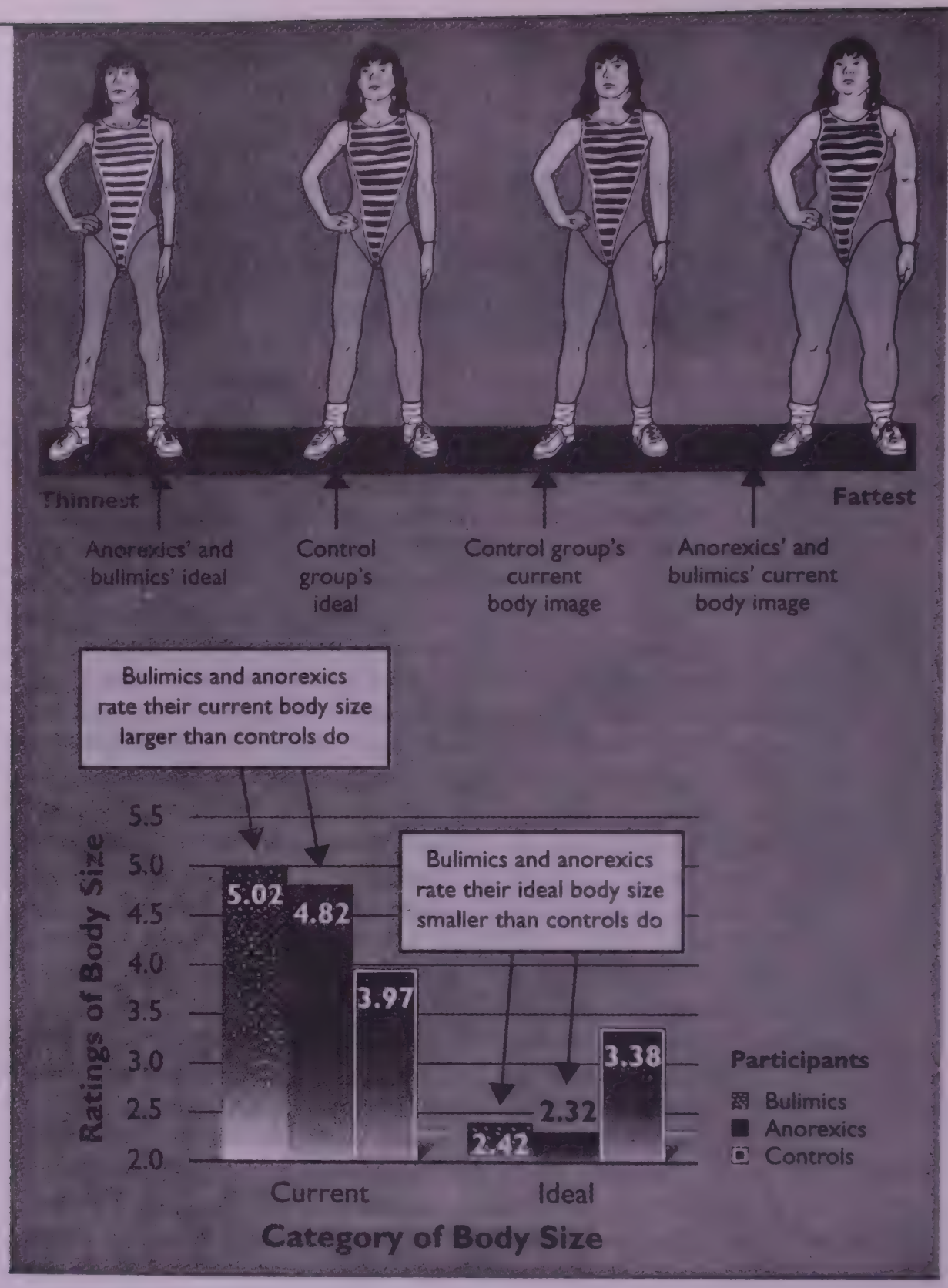
Why do so many young women—as many as 10 percent of American college women—suffer from such eating disorders? The causes are certainly complex, but one of the most important seems to be the fact that many young women are highly dissatisfied with their appearance—especially with the appearance of their bodies (Allgood-Merton & Lewinsohn, 1990). Indeed, they are much more dissatisfied in this respect than males of the same age. Their dissatisfaction, in turn, seems to stem from the emphasis many societies place on female attractiveness. When that emphasis is coupled with the powerful "thin-is-in" message conveyed by the fashion industry and mass media, it is not surprising that many young women conclude that they are overweight; after all, their bodies are much rounder than those of the fashion models and actresses who are held up as paragons of female perfection. Interestingly, many men do not find such extreme thinness in women attractive; on the contrary, they report preferring a body size somewhat larger than the one women rate as ideal (Fallon & Rozin, 1985).

Strong evidence for the role of dissatisfaction with one's body in the occurrence of anorexia and bulimia is provided by the results of several studies (e.g., Thompson, 1992; Williamson, 1990). For example, in one revealing investigation (Williamson, Cubic, & Gleaves, 1993), three groups of young women—ones diagnosed as bulimic, ones diagnosed as anorexic, and ones not suffering from any eating disorder—were asked to rate silhouettes of women ranging from ones that were emaciated to ones that were very obese. First they selected the silhouette that most accurately represented their own *current* body size, then they rated the silhouette that represented the body size they most preferred (their *ideal*). Since persons suffering from anorexia are indeed very thin, it is not surprising that anorexic persons rated their current body size as smaller than did persons in the control group. However, when **body-mass index** (current body size) was held constant statistically, a different pattern of findings emerged: Both bulimic and anorexic participants rated their current body size as larger than did control participants, and both rated their ideal as smaller than did controls (see Figure 10.5 on page 384). In other words, when current body

Body-Mass Index: *A measure of degree of obesity, based on the ratio between height and weight.*

Dissatisfaction with One's Own Body: An Important Factor in Eating Disorders

As shown here, when actual body size was statistically controlled, both anorexics and bulimics viewed their current body size as larger than did controls, and both rated their ideal body size as smaller than did controls.
(*Source:* Based on data from Williamson, Cubic, & Gleaves, 1993.)



Key Points

- Eating is regulated by complex biochemical systems within the body. It is also affected by the sight of food, feedback from chewing and swallowing, and cultural factors.
- Many factors contribute to obesity. These include eating habits, reactions to stress, basal metabolic rate, and responses to food-related cues.
- Anorexia nervosa and bulimia are two serious eating disorders. Both anorexics and bulimics are dissatisfied with their bodies and perceive their body size as larger than it actually is.

weight was taken into account, both anorexics and bulimics viewed themselves as further from their ideal than persons not suffering from any eating disorder.

Several additional points help complete the picture: (1) Bulimics tend to be more preoccupied with their physical appearance than other persons (e.g., Casper, 1990); (2) bulimics are lower in social self-confidence (higher in social anxiety) than other persons (e.g., Tobin et al., 1991); and (3) bulimics' reduced self-consciousness and heightened social anxiety are linked to lower satisfaction with their own bodies (Striegel-Moore, Silberstein, & Rodin, 1993). Together, these findings indicate that bulimics are indeed trapped in a vicious circle from which they can usually escape only with professional help (Thompson, 1992).

Sexual Motivation: The Most Intimate Motive

Suppose that voyagers from another planet arrived on Earth and visited many large cities. What would they see? Among other things, countless signs, billboards, and advertisements focused on two topics: food and sex. As a result, the space aliens might quickly conclude that human beings are obsessed with these two topics. Since we have already considered hunger in some detail, we'll now turn to **sexual motivation**, or motivation to engage in sexual activity—clearly another very strong force in human behavior.

Food and Sex: Obsessions of Modern Western Society?

Sights such as this might make visitors from different cultures believe that our society is obsessed with two things: food and sex.

Hormones and Sexual Behavior: Activation and Differentiation As we saw in chapter 9, the onset of puberty involves rapid increases in the activity of the sex glands, or **gonads**. The hormones the gonads produce have many effects on the body. A key question from the perspective of this discussion, however, is: Do these hormones influence sexual motivation? In most organisms other than human beings, the answer seems to be yes. Sex hormones exert what are usually termed *activational effects*. In their absence, sexual behavior does not occur or takes place with a very low frequency. For example, in many animals removal of the ovaries totally eliminates female sexual receptivity. Removal of the testes in males produces similar though somewhat less clear-cut results. For many species, in short, hormones play a key role in sexual motivation.

Human beings, however, are something of an exception to this general pattern. Most women do not report large changes in sexual desire over the course of their monthly cycle, despite major shifts in the concentration of various sex hormones in their blood (Kelley & Byrne, 1992). Further, many continue to engage in and enjoy sexual relations after *menopause*, when the hormonal output of their ovaries drops sharply. And in men there is little evidence of a clear link between blood levels of sex hormones such as *testosterone* and sexual responsiveness (Byrne, 1982).

This is not to say, however, that sex hormones play no role in human sexual motivation. Some women do report peaks of sexual arousal in the middle of their cycle and again prior to menstruation (Harvey, 1987). Among males, there is some evidence that testosterone levels are associated with differences in sexual arousal. For example, men with high levels of testosterone become aroused more quickly by erotic films than those with relatively low levels (Lange et al., 1980). In general, though, the link between sex hormones and sexual motivation appears to be far less clear-cut and less compelling for human beings than is true for many other species.

Other chemical substances within the body, however, may play more direct—and dramatic—roles. Recent findings suggest that when human beings are sexually attracted to another person, their brain produces increased amounts of several substances that are related to *amphetamines*. As you probably recall from chapter 4, amphetamines are stimulants, so the increased production of amphetamine-like substances such as phenylethylamine (PEA) may account for the fact that many people describe strong

Sexual Motivation: *Motivation to engage in various forms of sexual activity.*

Gonads: *The primary sex glands.*

sexual attraction—the first stage in falling in love—as a feeling that "sweeps them away." As one researcher puts it, "love is a natural high" (Walsh, 1993), one that confirms the words of the old song, "I get a kick out of you."

In sum, while sex hormones do not seem to be as clearly linked to sexual motivation in humans as in other species, there is some scientific evidence for the view that other substances produced by our bodies do play an important role in such motivation, and even in romantic love. Does this mean that we will someday be able to produce pills that can cause us to fall in (or out of) love? Probably not; because, as we'll now see, where human beings are concerned, cognitive factors—our own thoughts, fantasies, and memories—play a very powerful role in sexual motivation. But there does seem to be a biochemistry of love, and biochemical effects, too, deserve careful attention as we try to understand the nature of human sexual motivation.

Human Sexual Behavior: Some Basic Facts Until the 1960s the only source of scientific information about human sexual motivation was that provided by surveys. The most famous of these were the *Kinsey Reports,* published in the 1940s and 1950s. These surveys, which were based on interviews with more than ten thousand women and men, yielded many surprising facts. Half a century ago, most men and nearly half of the women reported having engaged in premarital sex (Kinsey, Pomeroy, & Martin, 1984; Kinsey et al., 1953). Further, it appeared that many couples engaged in practices that society then considered to be objectionable, such as oral sex and a wide variety of sexual positions. If there is one basic theme in the Kinsey data, though, it is this: Where sexual behavior is concerned, individual differences are enormous. Some people reported remaining celibate for years; others reported engaging in sexual relations with a large number of partners. Some reported that orgasms were a rare occurrence, but a few indicated that they experienced three or more every day.

Please note the word *reported*, however. Survey data such as those obtained by Kinsey and others are always open to question. First, who agrees to participate in a given survey? Many persons refuse, and it is impossible to tell how the findings might change if *their* patterns of sexual behavior were included. Second, how accurate are self-reports? Do participants describe their sexual behavior and sexual motivation accurately? Or do they exaggerate, fail to provide some information, and generally seek to present themselves in a favorable light? These complex issues always leave the interpretation of survey results somewhat in doubt.

Starting in the 1960s, however, another source of information about human sexual motivation became available: direct and systematic observation of actual sexual activities. The first and still the most famous project of this kind was conducted by Masters and Johnson in the mid-1960s (Masters & Johnson, 1966). These researchers observed, filmed, and monitored the reactions of several hundred volunteers of both sexes as they engaged in sexual intercourse or masturbation. More than ten thousand cycles of arousal and satisfaction were studied. The results yielded important insights into the nature of human sexuality. Perhaps the clearest finding was the fact that both males and females move through four distinct phases during sexual behavior.

First, they enter the *excitement phase*. During this phase, many physiological changes indicative of growing sexual excitement occur. The penis and clitoris become enlarged, vaginal lubrication increases, and nipples may become erect in both sexes. If sexual stimulation persists, both women and men enter the *plateau phase.* The size of the penis increases still further, and the outer third of the vagina becomes engorged with blood, reducing its diameter. Muscle tension, respiration, heart rate, and blood pressure all rise to high levels.

After a variable period of direct stimulation, both males and females approach the *orgasmic phase*. This consists of several contractions of the muscles surrounding the genitals, along with intense sensations of pleasure. The pattern of contractions, including their timing and length, is virtually identical in females and males.

The most striking difference between the two sexes occurs during the final *resolution phase*. For males, orgasm is followed by a reduction in sexual and physiological arousal. Males then enter a *refractory period* during which they cannot be sexually aroused or experience another orgasm. Among females, in contrast, two distinct patterns are possible. They, too, may experience a reduction in sexual and physiological arousal. Alternatively, if stimulation continues, they may experience additional orgasms.

The basic pattern just described seems to apply to all human beings. However, practically everything else seems to vary from one society to another. Different cultures have widely different standards about such matters as (1) the age at which sexual behavior should begin, (2) the frequency with which it should occur, (3) physical characteristics considered attractive or sexy, (4) the particular positions and practices that are acceptable, (5) the proper time and setting for sexual relations, (6) the persons who are appropriate partners, and (7) the number of partners individuals should have at one time or in succession. So, to repeat: where human sexuality is concerned, *variability* is definitely the central theme.

Human Sexual Behavior: What's Arousing and Why Clearly, sexual motivation plays an important role in human behavior. But what, precisely, stimulates arousal? In certain respects, the same events or stimuli that produce arousal in other species. First, direct physical contacts—various forms of touching and foreplay—generate arousal. Second, there is some evidence that human beings, like other organisms, can be sexually aroused by certain naturally occurring odors.

For example, one study found that approximately 20 percent of males appear to be sexually stimulated by the scents of copulins, chemicals found in vaginal secretions (Hassett, 1978). More recently, some scientists have reported that odorless natural substances known as pheromones can produce sexual attraction and arousal in both males and females (Blakeslee, 1993). On the basis of these findings, large perfume companies have added synthetic human pheromones to products. Will wearing such perfumes make you more attractive to the opposite sex, as advertised? Since the "scientific reports" on which these claims are based are unpublished, my advice is simple: View such ads with a healthy degree of skepticism (Cain, 1988; Ehrlichman & Bastone, 1990).

One potential source of sexual motivation, however, does seem to set human beings apart from other species: real or imagined erotic stimuli and images. Unlike other species, human beings possess the capacity to generate their own sexual arousal on the basis of erotic fantasies or daydreams. And many people respond strongly to *erotic materials* containing either visual images or verbal descriptions of sexual behavior.

With respect to self-generated imagery, research findings indicate that many people can produce intense sexual arousal, even orgasm, through internally generated sexual images (Money, 1985). Further, many report using sexual thoughts or images to enhance their pleasure during sexual intercourse or masturbation, or to speed up or delay the occurrence of orgasms (Davidson & Hoffman, 1986). In these and other ways, our impressive cognitive abilities can play a major role in sexual motivation.

Pheromones: A Source of Sexual Attraction?

Some research findings suggest that pheromones—odorless substances produced by our bodies—may play a role in sexual attraction and arousal. Some colognes and perfumes supposedly have similar powers, but scientific research has not supported such claims.

External erotic stimuli, too, can produce such effects. Virtually every physiological reaction and behavior recorded by Masters and Johnson during actual sexual activity can occur in response to erotic movies, tapes, or written descriptions (Kelley & Byrne, 1992). Of course, not all persons find all materials of this type equally exciting. Explicit erotic materials can be too explicit for some people's taste, so that exposure to them reduces rather than increases sexual motivation (Zillmann, 1984). However, given erotic stimuli that they *do* find attractive, most persons can be sexually aroused in this indirect manner.

If the only effects produced by erotic materials were increases in sexual motivation and perhaps sexual behavior, there would be little reason to discuss them further. Unfortunately, however, growing evidence suggests that exposure to such materials produces other effects as well—effects that many people find objectionable. First, repeated exposure to explicit erotica has been found to increase viewers' estimates of the frequency of several unusual and widely disapproved sexual practices, including *sadomasochism* (sexual practices in which participants physically hurt one another), human-animal contact, and sex between adults and children (Zillmann & Bryant, 1984). Second, exposure to explicit erotic materials seems to reduce viewers' satisfaction with their own sex lives and with their current sexual partner (e.g., Zillmann & Bryant, 1988). These findings suggest that the ready availability of erotic materials in many societies may have social consequences that were not fully anticipated when widespread sale of such materials was legalized.

Gender Differences in Sexual Jealousy: A Sociobiological Perspective

Many nonhuman species are monogamous: They mate for life. Do these animals experience jealousy if they discover their mate with another member of the opposite sex? At present, we don't know. But we *do* know that **sexual jealousy**—a negative state aroused by a perceived threat to one's valued sexual relationship with another person—is very common among our own species (Salovey, 1991; White & Mullen, 1990). As you undoubtedly know from your own experience, both women and men experience sexual jealousy. Recent findings suggest, however, that the two sexes may differ in some ways with respect to such reactions. Specifically, it appears that men may experience more intense jealousy in response to *sexual* infidelity on the part of their partners, while women may experience more intense jealousy in response to *emotional* infidelity (Buss et al., 1992). Why should this be so? The field of *sociobiology* (or *evolutionary psychology* as it is sometimes known; Buss, 1990) provides one potential answer.

According to sociobiology, men should be especially upset by sexual infidelity for two reasons: (1) A man can never be perfectly certain that he is the father of his children, and (2) men invest lots of energy and resources in caring for their mates and their offspring. If a man's partner engages in sexual relations with other males, therefore, he runs the risk of investing resources in another man's children! Emotional infidelity, as long as it doesn't result in actual sexual relations, is less threatening, for obvious reasons.

What about women—why should they find emotional infidelity so disturbing? From a sociobiological perspective, the answer is as follows: Women know with certainty that they are the mothers of their children. However, throughout most of human history, women needed the assistance of a male to raise their children. Emotional infidelity threatened such support, for if a woman's mate fell in love with another woman, he might leave, taking with him his needed support and assistance. In contrast, sexual infidelity by the mate would pose no threat as long as he didn't become seriously involved with the other woman.

These are controversial suggestions, to say the least, and are certain to anger some persons. But political or social reactions aside, they are supported

Sexual Jealousy: *A negative state aroused by a perceived threat to one's sexual relationship with another person.*

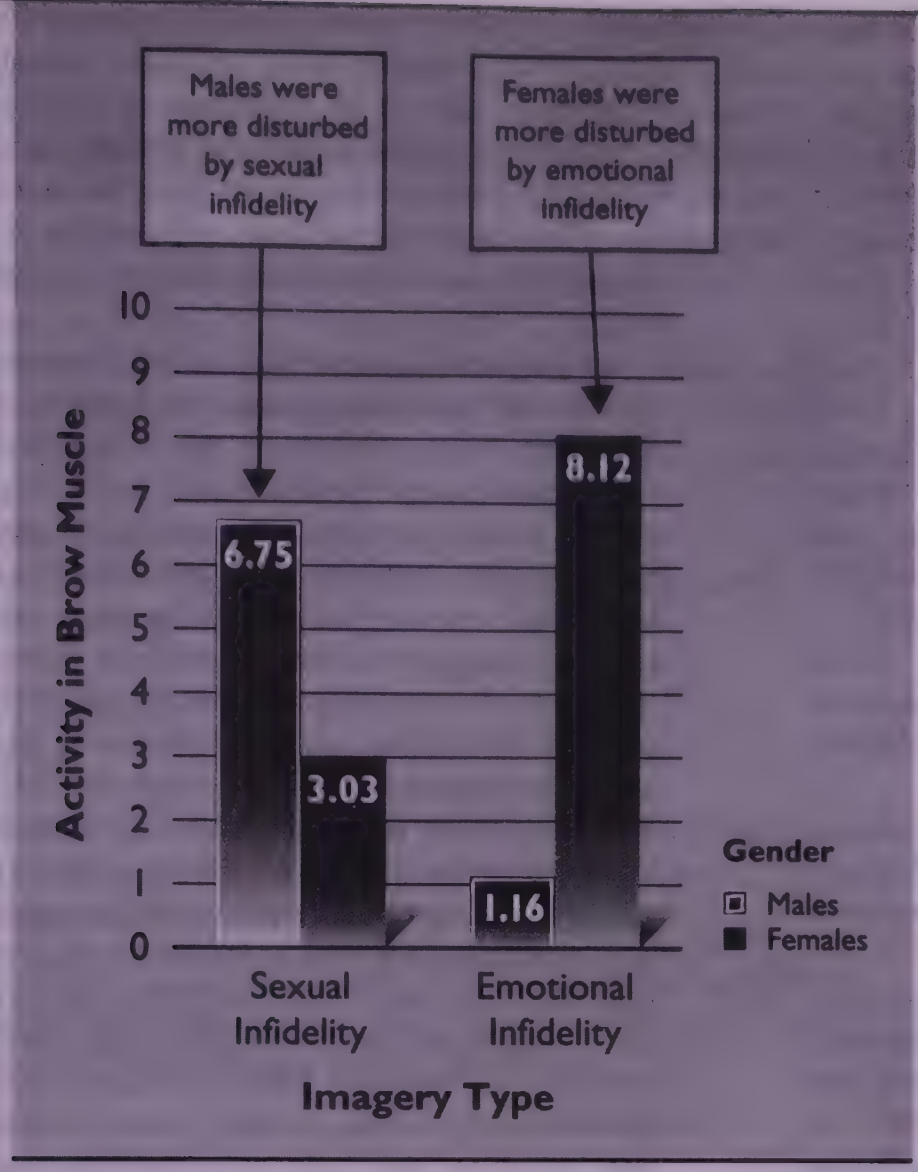


FIGURE 10.6

Gender Differences in Sexual Jealousy

Females were more disturbed by imagining scenes in which their romantic partner was falling in love with another person, while males were more disturbed by imagining scenes in which their partner engaged in sexual relations with another person.
(*Source:* Based on data from Buss et al., 1993.)

by the findings of several studies conducted by Buss and his colleagues (Buss et al., 1992). In one of these investigations, male and female students were asked to indicate which would upset them more: imagining that their romantic partner was forming a deep emotional attachment to another person, or learning that their partner was enjoying passionate sexual intercourse with that person. Results were clear: A large majority of the men (60 percent) reported greater distress over sexual infidelity, while a large majority of the women (83 percent) reported greater distress over emotional infidelity.

In a follow-up study, male and female participants were asked to imagine that their partner was having sexual intercourse with another person, and that their partner was falling in love with another person. While the participants were imagining these scenes, the researchers recorded their physiological reactions: activity in a facial muscle involved in frowning, pulse rate, and electrodermal activity (electrical conductivity of the skin). Again the results were clear. Males showed greater arousal and more signs of frowning when imagining sexual infidelity; females showed greater arousal and more frowning when imagining emotional infidelity (see Figure 10.6).

Taken together, these findings and those of other studies (Buss, 1989) indicate that males and females may indeed differ with respect to the kinds of situations or events that make them jealous. Men seem to find sexual infidelity more disturbing than emotional infidelity, while women show the opposite pattern. Are such differences really due to the factors sociobiology emphasizes—certainty of parenthood and covering one's investments? Firm conclusions will have to await the completion of additional research.

Sexual Orientation Estimates vary, but it appears that about 2 percent of all adults are exclusively **homosexual** in their sexual orientation: They engage in sexual relations only with members of their own sex (Kelley & Byrne, 1992). In addition, many other persons, perhaps another 2 or 3 percent of each sex, are **bisexual**: They seek out and enjoy sexual contact with members of both sexes. The remainder of the population is **heterosexual** and engages in sexual relations only with members of the opposite sex.

In the past, homosexuals of both sexes often remained "in the closet," concealing their orientation from others. Since the early 1970s, however, the situation has changed radically, and many homosexuals have engaged in vigorous efforts to be gain equal treatment in many areas of life—employment, housing, military service, education, and so on—even when openly avowing their orientation. This continuing struggle and the controversy surrounding it have led to renewed interest in a basic question: What factors influence or determine sexual orientation? In other words, why are some persons exclusively homosexual while most others are exclusively heterosexual? Unfortunately, research findings to date have failed to yield any firm or definite answers. All of the most obvious possibilities appear to be false. Male homosexuals do not have lower levels of male sex hormones than heterosexuals (Gladue, 1991), and increasing their levels of male sex hormones does not alter their homosexual preferences (Money, 1980). Similarly, careful study of the family backgrounds of both male and female homosexuals has failed to yield any reliable differences between these groups and heterosexuals (Hammersmith, 1982).

Another theory is that homosexuality stems from experiences during puberty (Storms, 1981). According to this view, some individuals learn to associate their emerging sexual impulses with members of their own sex and so develop homosexual preferences. At present, however, direct evidence for such effects is lacking. Moreover, many persons who are homosexual report that they had sexual fantasies and thoughts about members of their own sex long before puberty.

This latter finding is consistent with yet another possible explanation for the origin of homosexuality: the view that genetic factors may play an important role (Henry, 1993). Perhaps the most convincing evidence for this view to date is provided by the results of a study conducted by the National Cancer Institute's Laboratory of Biochemistry and published in the prestigious journal *Science*. In this study it was found that a higher proportion of the male relatives of male homosexuals than would be expected by chance were also homosexual—but only on the *maternal* side of these families. Specifically, about 7.5 percent of the male cousins and uncles of the male homosexuals studied were homosexual, versus about 2 percent in the general population. This was true only for male relatives related to participants' mothers, however; the rate of homosexuality among male relatives on the fathers' side was *not* higher than that of the general population. These findings suggest that a tendency toward homosexuality may be inherited and that it may be linked somehow to the X chromosome that all children inherit from their mothers (refer to chapter 2). Further evidence for this conclusion is provided by additional research in which DNA samples were obtained from

KEY POINTS

- Sex hormones seem to play a relatively minor role in human sexual motivation. Other substances produced within the body may also play a role in sexual attraction and love.
- During sexual activity both males and females move through a series of distinct phases: excitement, plateau, orgasm, and resolution.
- In contrast to other species, humans can be sexually aroused by self-generated sexual fantasies and by exposure to erotic materials.
- Individuals differ in sexual orientation. Some are exclusively homosexual, others are bisexual, and the majority are exclusively heterosexual.
- Male homosexuals do not have lower testosterone levels than male heterosexuals, and homosexuals and heterosexuals do not appear to differ in terms of family backgrounds or early experiences.
- Recent evidence suggests that genetic factors may play a role in homosexuality.

***Homosexual** (sexual orientation): A sexual orientation in which individuals prefer sexual relations with members of their own sex.*

***Bisexual** (sexual orientation): A sexual orientation in which individuals seek sexual relations with members of both their own and the other sex.*

***Heterosexual** (sexual orientation): A sexual orientation in which individuals engage in sexual relations only with members of the other sex.*

forty pairs of homosexual brothers. In thirty-three of the pairs, a portion of the X chromosome matched exactly (cited in Henry, 1993).

Taken together, these and related findings suggest that homosexuality may stem at least in part from genetic factors. However, this in no way implies that a homosexual orientation is set in stone, or that all persons who inherit homosexual tendencies will become homosexual. On the contrary, it is clear that environmental factors, too, play an important role. Still, the finding that a tendency toward homosexuality may be inherited is consistent with the experience of many homosexuals, who often feel that they knew they were "different" from most other persons from a very early age. As one man recently put it (quoted in Henry, 1993), "I always believed that homosexuality was something I was born with. If homosexuality is genetic, there is nothing you can do about it. If there is more research like this in years to come, hopefully homosexuality will be accepted rather than treated as an abnormality."

Aggressive Motivation: The Most Dangerous Motive

War. Murder. Rape. Child abuse. In the 1990s no one—neither passengers in commuter trains nor motorists on interstate highways—seems safe from acts of violence. Consider the following statistics:

- More than two million people are knifed, shot, or otherwise assaulted each year in the United States alone; more than twenty-three thousand of them die as a result of these attacks (Toufexis, 1993).
- Physical violence between spouses occurs in almost one-third of all marriages (Russell, 1988).
- Each year many thousands of children die as a result of child abuse—much of it inflicted by their own parents (Pagelow, 1984).

Such facts suggest that **aggressive motivation**—the desire to inflict harm on others—plays an all-too-common role in human affairs. Aggressive motivation often results in the occurrence of overt forms of **aggression**, or behavior directed toward the goal of injuring another living being who wishes to avoid such treatment (Baron & Richardson, 1994).

The Roots of Aggression: Innate Tendency or Externally Elicited Behavior? Is aggression an inherited and unavoidable human tendency? Freud, for one, believed that it is. After witnessing the wholesale carnage of World War I, he concluded, pessimistically, that human beings possess a powerful built-in tendency to harm others. While this view has been shared by many other scientists—for example, Konrad Lorenz, the famous *ethologist*—it is definitely *not* widely accepted by present-day psychologists (Berkowitz, 1990). Most believe that aggression, like many other forms of motivation, is elicited by a wide range of external events and stimuli. In other words, it is often "pulled" from without rather than "pushed" or driven from within. This is not to suggest that aggression has *no* biological or genetic roots. On the contrary, growing evidence indicates that such factors do play a role in the occurrence of violent crime (Gladue, 1991). For example, it has recently been reported that men convicted of impulsive crimes of violence, such as murdering strangers, have lower than normal amounts of serotonin in their brains; in contrast, those convicted of cold-blooded, premeditated aggressive crimes show normal levels of serotonin (Toufexis, 1993). This suggests that deficits in serotonin may somehow interfere with neural mecha-

Aggressive Motivation: *The desire to inflict harm on others.*

Aggression: *Behavior directed toward the goal of harming another living being who wishes to avoid such treatment.*

Table 10.1

Factors Influencing Aggression

As shown here, aggression is influenced by a wide range of social, environmental, and personal factors.

Factor	Effect on Aggression
High temperatures	Increase aggression
Audience	Increases aggression when this is a strong (dominant) tendency; decreases aggression if audience disapproves of this behavior
Exposure to aggressive models (others behaving aggressively)	Increases aggression
Heightened arousal	Increases aggression when arousal is interpreted as provocation or frustration
Alcohol	Increases aggression in large doses; reduces aggression in very small doses
Apologies, explanations for provocative actions	Reduce aggression if accepted as sincere
Humorous materials	Reduce aggression if they induce feelings of amusement
Signs of pain on part of victim	Increase aggression if aggressor is very angry; reduce aggression if anger is low
Type A behavior pattern	Increases aggression in many situations
Presence of weapons (not used in assault)	Increases aggression because of previous association with such behavior

nisms that normally inhibit the outward expression of rage. In most cases, however, aggression seems to stem primarily from social and environmental factors.

One variable that has often been suggested as an important cause of aggressive motivation is **frustration**—the thwarting or blocking of goal-directed behavior. In other words, people experience the desire to harm others when these individuals, or perhaps others, have prevented them from obtaining what they want. The strongest statement of this view is the famous *frustration-aggression hypothesis*, which proposes that aggression always stems from frustration and that frustration always produces aggression. It is now clear that these assertions are far too sweeping in scope. Aggression often stems from causes other than frustration: direct provocation from others, exposure to others behaving in an aggressive manner, the presence of weapons or other stimuli associated with aggression, and the consumption of alcohol, to name a few (Baron & Richardson, 1994). And frustration often produces depression or resignation rather than aggression against others. So frustration is only one of many different factors that elicit aggression, and frustration seems to produce such effects only when it is unexpected and is viewed as unfair or illegitimate (Berkowitz, 1989). An overview of the many social, environmental, and personal factors that have been found to increase the likelihood or intensity of aggression is presented in Table 10.1. Even a quick review of this table suggests why reducing the level of aggression in any given society is a complex and challenging task.

Frustration: *The blocking of ongoing goal-directed behavior.*

What about cultural factors? Do they too play an important role with respect to the outward expression of aggressive motivation? For information on this topic, please see the following **Perspectives on Diversity** section.

The Role of Cultural Factors in Aggression: The Social Context of Violence

Do cultures differ with respect to the expression of aggression? Figure 10.7 provides a partial answer: As you can see, murder is much more frequent in the United States than in other industrialized nations—from ten to twenty times higher than in some nations, by some estimates (Scott, 1992). What accounts for differences like those shown in Figure 10.7? The answer is complex, but the existence of such differences suggests that cultural variables often exert powerful effects on aggression. Let's take a brief look at several of these variables.

Aggression and Self-Perception: A Case in Point

In the Mexican state of Oxaca, there are two Zapotec villages located less than four miles apart. The two villages, which have existed for at least 450 years, are very similar in terms of language, religion, economics, and virtually every other aspect. Yet the murder rate in one is more than six times higher than in the other (Fry, 1990). What accounts for this difference? Careful comparison of the villages suggests that the key differences lie in contrasting *self-perceptions*. In the relatively non-violent village, residents describe themselves as peaceful, kind, and respectful of the rights of others. In the more violent village, in contrast, the people describe themselves as tough and aggressive and perceive overt acts of aggression, such as fistfights and spouse abuse, as proof of their vigor and strength. How did these contrasting views originate? The answer is lost in the mists of time, but in attempting to explain them, one investigator (Scott, 1992) suggests that the two villages were probably founded by persons with contrasting perspectives on aggression, and that the norms established in

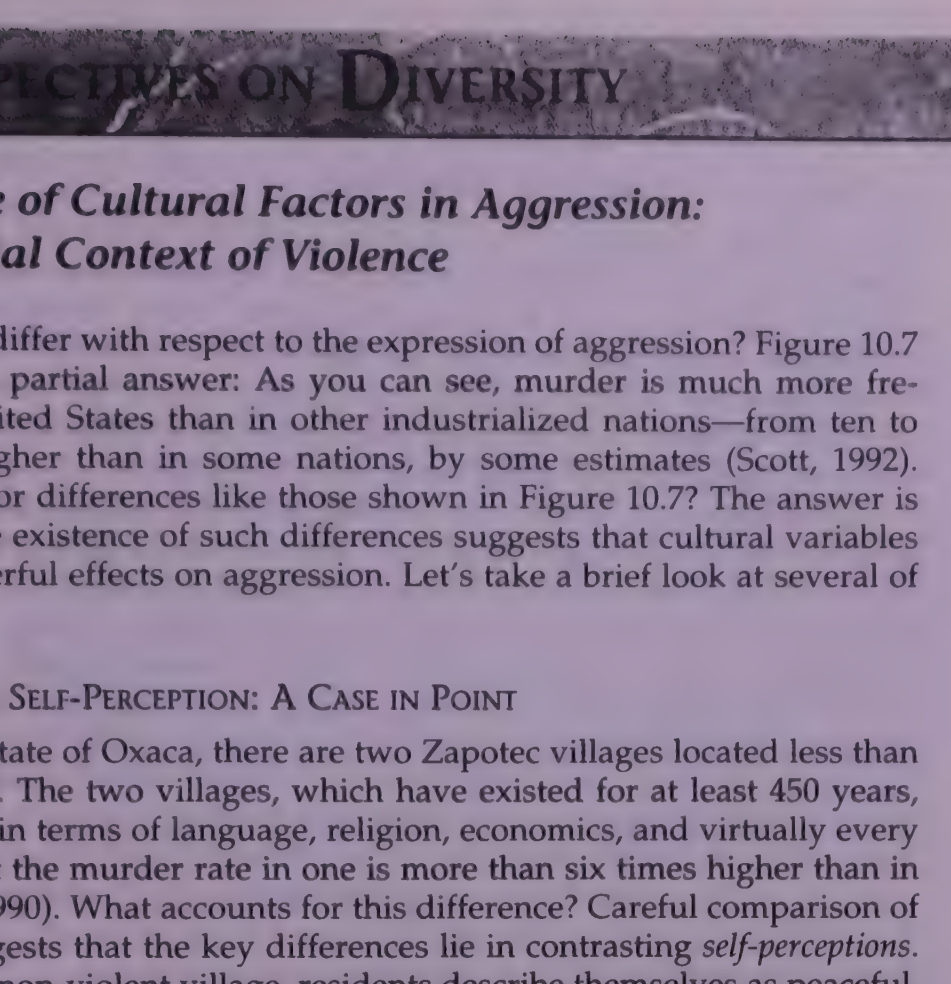


Figure 10.7

Cultural Differences in Aggression

As shown here, murders are much more frequent in the United States than in other industrialized nations. Differences such as these suggest that cultural factors play an important role in aggression.
(*Source:* Based on data from Scott, 1992.)

those long-vanished days have persisted up until the present, finding expression in the sharply contrasting rates of violence we now observe.

Culture and Reactions to Frustration

One especially important way in which culture influences aggression is by determining when and how reactions to frustration are expressed. In many cultures aggression is a strongly disapproved form of behavior, so persons exposed to frustration are urged to demonstrate restraint. For example, in Sri Lanka, *quiet self-control* is highly valued (Spencer, 1990). As a result, people generally refrain from aggression in response to provocations that would evoke strong retaliation from people in other cultures.

A clear illustration of the role of cultural factors in shaping reactions to frustration is provided by a study conducted by Kaufman, Gregory, and Stephan (1990). They examined the reactions of Anglo and Hispanic students in the United States to one important type of frustration: being an ethnic minority in their schools. Kaufman and his colleagues predicted that because Hispanic culture strongly emphasizes being *simpatico*—being likable, easygoing, and fun to be with—Hispanic children would demonstrate increased moodiness but *not* increased aggression when in classrooms where they were an ethnic minority. In contrast, because Anglo culture is more accepting of overt aggression, Kaufman, Gregory, and Stephan (1990) expected that Anglo children might demonstrate higher levels of aggression when they were an ethnic minority. This is precisely what was found. These and related findings illustrate the important role of culture in shaping the form and incidence of aggression in many contexts.

The Persistence of Cultural Differences in Aggression

One final point: why do cultural differences in aggression persist? One answer seems to lie in cultures' varied beliefs about the appropriateness of aggression and the different child-rearing practices these encourage. For example, a recent study by Osterwell and Nagano-Nakamura (1992) compared Japanese and Israeli mothers' views about aggression. The researchers found that Japanese mothers tend to view aggression as a natural part of their children's behavior, but believe that it should be expressed *within* the family, where it can be regulated and will do no serious harm. In contrast, Israeli mothers believe that aggression is mainly a response to external provocations, and they feel that it should be expressed *outside* the family rather than within it. Such contrasting beliefs about aggression influence child-rearing practices in different cultures, and these practices, in turn, help explain why cultural differences in the rate and intensity of many forms of aggression tend to persist over time (Fraczek & Kirwil, 1992).

Achievement and Power: Two Complex Human Motives

Achievement Motivation: *The desire to accomplish difficult tasks and meet standards of excellence.*

Power Motivation: *Motivation to be in charge, have high status, and exert influence over others.*

Hunger, sex, and aggression: these are motives we share with many other forms of life. There are some motives, however, that, as far as we can tell, are unique to our own species. We'll focus on two that are often closely interrelated: **achievement motivation** and **power motivation**. Achievement motivation is the desire to meet standards of excellence—to outperform others and accomplish difficult tasks (McClelland, 1961). Power motivation is the desire to be in charge, to have status and prestige and influence others (Winter, 1973). Such motives do not derive directly from basic biological factors, as do hunger, thirst, and, to some extent, sexuality. Yet they exert powerful effects on behavior in many different contexts.

Achievement Motivation: The Quest for Excellence That individuals differ greatly in the desire for achievement is obvious. For some persons, accomplishing difficult tasks and meeting high standards of excellence are extremely important. For others, just getting by is quite enough. How can differences in this motive be measured? What are their effects? These are the issues that have received most attention in past research.

Measuring achievement and power motivation. The same basic method is used for measuring both achievement and power motivation. This technique, known as the **Thematic Apperception Test (TAT)**, consists of a series of ambiguous pictures, such as an individual staring thoughtfully into space or an older person talking to a younger one. Persons completing the TAT are shown the pictures and asked to make up stories about them. The content of the stories is then evaluated by means of carefully developed keys, in order to yield scores for achievement and power motivation (McClelland, 1975). While the TAT continues to be used in its original form, Winter (1983) has also developed a technique for scoring these motives directly from any type of verbal material, without the need for ambiguous pictures or for people to make up stories about them. Winter's technique can be applied to books, speeches, or any other written material in order to obtain an index of the author's achievement and power motivation.

Effects of achievement and power motivation. Do individual differences in achievement and power motivation really matter? In other words, do persons high and low in these motives have contrasting life experiences? Growing evidence suggests that they do. As you might expect, individuals high in achievement motivation tend to get higher grades in school, earn more rapid promotions, and attain greater success in running their own businesses than persons low in such motivation (Andrews, 1967; Raynor, 1970). Perhaps more surprising is the fact that persons high in achievement motivation tend to prefer situations involving moderate levels of risk or difficulty to ones that are very low or very high on these dimensions (Atkinson & Litwin, 1960). Why? The answer seems to lie in the fact that in situations involving moderate risk or difficulty there is a good chance of success, but there is also a sense of challenge. In contrast, in situations that are very high in risk or difficulty, failure is likely—and high achievement persons dislike failure intensely. Finally, situations that are very low in risk or difficulty fail to provide the challenge that persons high in achievement motivation relish.

Gender differences in achievement motivation: Do they really exist? If you ever watch old films made in the 1940s or 1950s, you may observe the following situation: A teenage girl is brighter or more competent at some task than a teenage boy. Yet she avoids letting him know this, because she is afraid that he will be threatened by this fact and so like her less.

Do such scenes reflect real-life events? In the past, it appears that they did. Traditional concepts of femininity seemed incompatible with high levels of competence, success, or achievement motivation on the part of women. Taking note of this fact, Horner (1970, 1972) suggested that many women actually feared success: They realized that striving for achievement could reduce their femininity in the eyes of others. She then found evidence for the existence of *fear of success* among young women. In Horner's research, female undergraduates were asked to tell a story about Anne, a young woman who found herself at the top of her medical school class. Male undergraduates were given the same task with respect to a young man named John. Almost all the men wrote stories predicting a happy and successful life for the male character. In con-

Thematic Apperception Test (TAT): *A psychological test used to assess individual differences in several motives, such as achievement motivation and power motivation.*

trast, about two-thirds of the women wrote stories predicting serious problems for Anne. She was seen as having a future in which she would be rejected by others (especially men) and would be lonely and isolated. From these findings, Horner concluded that women did indeed fear success.

Fortunately, these results were *not* replicated in subsequent investigations (Cherry & Deaux, 1975). Recent research, moreover, indicates that what the women in Horner's studies feared was not success itself, but social rejection. Thus, many psychologists now doubt that the fear of success reported by Horner ever existed at all. Her findings seem more likely to have been an artifact stemming from the specific methods she used than from any real difference between females and males with respect to feelings about success.

Intrinsic Motivation: How (Sometimes) to Turn Play into Work

Individuals perform many activities simply because they find them enjoyable. Everything from hobbies to gourmet dining to lovemaking fits within this category. Such activities may be described as deriving from **intrinsic motivation;** that is, we perform these activities primarily because of the pleasure they yield, not because they lead to other, external rewards. But what happens if people are given external rewards for performing such activities—if, for example, they are paid for sipping vintage wines or for pursuing their favorite hobby? Some research findings suggest that they may then actually experience reductions in intrinsic motivation. In other words, they may become *less* motivated to engage in such activities. Why? Perhaps, on considering their own behavior, such overrewarded persons conclude that they chose to perform the activities partly to obtain the external reward—the payment—provided. To the extent they reach that conclusion, they may then view their own interest as lower than was previously the case. They may shift from explaining their behavior in terms of intrinsic motivation ("I do it because I enjoy it") to explaining it in terms of external rewards ("I do it partly to obtain some kind of payment").

Many studies support this explanation. In such research, some participants were provided with extrinsic rewards for engaging in a task they initially enjoyed, while others were not. When subsequently given an opportunity to perform the task, those who received the external rewards showed reduced motivation to do so (Deci, 1975; Lepper & Green, 1978). These results have important implications for anyone seeking to motivate others by means of rewards—parents, teachers, and managers, for example. (See the next **Point of It All** section.) The research suggests that if the target persons already enjoy various activities, offering them rewards for performing those activities may lower their intrinsic motivation and so, ultimately, produce the paradoxical effect of reducing rather than enhancing performance!

Fortunately, additional evidence suggests that this not always the case, and that intrinsic and extrinsic motivation are not necessarily incompatible (Rigby et al., 1992). In fact, Deci and his colleagues (e.g., Deci & Ryan, 1985) argue that

Key Points

- Aggressive motivation involves the desire to inflict harm on others. Aggression does not stem primarily from frustration; rather, it occurs in reaction to a wide range of social, environmental, personal, and cultural factors.
- Achievement motivation is the desire to outperform others and accomplish difficult tasks. Power motivation is the desire to be in charge and to influence others.
- Contrary to initial findings, there appear to be no major differences between males and females with respect to achievement motivation.
- When individuals engage in activities because they find them pleasurable rather than to obtain external rewards, they are said to be intrinsically motivated to perform them.
- Extrinsic rewards can sometimes reduce intrinsic motivation. However, this is not always true if the rewards are perceived as a sign of recognition for good performance.
- Intrinsic motivation has important implications for education and can sometimes be used to enhance students' learning and performance.

Intrinsic Motivation: *The desire to perform activities because they are rewarding in and of themselves.*

what is crucial is the extent to which individuals perceive various behaviors as *self-determined*. Intrinsically motivated behaviors are, by definition, self-determined. Extrinsically motivated actions, however, are not necessarily *non*–self-determined. If individuals find them congruent with their self-image, preferences, and values, they may view them as self-determined even though they yield extrinsic rewards. Only if such actions are perceived as ones that are not congruent with one's own preferences or wishes—as actions performed solely to gain external rewards—are rewards likely to reduce motivation.

This general principle is consistent with research findings indicating that if external rewards are viewed as signs of recognition rather than as bribes (Rosenfield, Folger, & Adelman, 1980), and if the rewards provided are large and satisfying (Fiske & Taylor, 1991), intrinsic motivation may be enhanced rather than reduced (Ryan, 1982). In view of these facts, we can conclude that paying people for doing things they enjoy can sometimes reduce their intrinsic motivation—turn play into work. But this is not always the case. When external rewards are delivered with care and in accordance with the principles just described, they can enhance rather than reduce motivation and performance. For information on how psychologists are putting their knowledge about intrinsic motivation to practical use, please see the **Point of It All** section below.

The Point of It All

Turning Work into Play: Intrinsic Motivation in the Classroom

It has often been contended that learning is—or at least should be—fun. A corollary of this belief is that classroom procedures children enjoy will facilitate their mastery of new ideas and concepts. In other words, when children enjoy activities occurring in their classes, they will become intrinsically motivated, and learning will be enhanced. Is this actually the case? Research performed recently by Lepper and his colleagues (Lepper & Cordova, 1992; Lepper & Hoddell, 1992) suggests that it is. Moreover, this research provides important insights into specific procedures that teachers can use to enhance children's intrinsic motivation.

The basis for these studies is the idea that children find tasks performed within a rich fantasy context to be intrinsically appealing. Thus, providing such a context will increase their intrinsic motivation and their performance. To test this general prediction, Lepper and his associates have conducted a number of studies using computer-based educational games.

As an example of this research, consider a study conducted by Parker and Lepper (1992), in which children learned to use a computer graphics system either under a motivation-embellished fantasy condition or in an unembellished context. There were three versions of the fantasy condition. In one, students were encouraged to think of themselves as pirates in search of buried treasure. In another, they were detectives hunting down criminals. In a third, they were astronauts seeking out new planets. In the control condition, in contrast, no fantasy context was provided. In all four groups children performed identical activities: learning to draw lines connecting various objects, negotiating a passage through a series of mazes, constructing simple geometric shapes. The researchers measured motivation to perform these tasks by asking the children to rate the appeal of the tasks. As predicted, the students rated the three fantasy games much higher than the unembellished one.

Learning was assessed by written tests of students' mastery of the graphics program. These were given immediately after the study or two weeks later. Again, results showed an impressive edge for the fantasy version: Both boys and girls performed much better after playing these versions than after the unembellished game.

In follow-up research using a different type of game—one resembling the game "Clue"—Lepper and his coworkers obtained information on *why* the children learned more from the fantasy-rich games. Apparently, they used more efficient problem-solving strategies and formulated hypotheses in a more systematic manner when playing in a fantasy-rich context where they were detectives than in an unembellished context.

Perhaps most important of all, when children were offered extrinsic rewards (a prize from the experimenter's mystery box) for solving the puzzle, their performance dropped sharply. They used simpler problem-solving strategies, formulated hypotheses less systematically, and perceived themselves as less competent at the task.

The implications of these findings for classroom education seem clear (Lepper & Cordova, 1992): Under appropriate conditions, increasing students' intrinsic motivation can enhance their learning of important concepts or materials. Put somewhat differently, to the extent teachers succeed in turning *work* into *play*, they may also substantially increase the learning and performance of their pupils.

EMOTIONS: Their Nature, Expression, and Impact

Can you imagine life without **emotions**—without joy, anger, sorrow, or fear? Probably you cannot, for emotions are essential to our personal existence. Without them, we wouldn't really be ourselves.

But what are emotions? The closer we look, the more complex these reactions seem to be. There is general agreement among scientists who have studied emotions, however, that they involve three major components: (1) physiological changes within our bodies—shifts in heart rate, blood pressure, and so on; (2) subjective cognitive states—the personal experiences we label as emotions; and (3) expressive behaviors—outward signs of these internal reactions (Izard, 1992; Zajonc & McIntosh, 1992).

In the discussion that follows, we'll first look at several contrasting theories of emotion. Then we'll consider how emotions are expressed. Finally, we'll examine the complex interplay between emotions and cognition—how the way we feel influences the way we think and vice versa.

THE NATURE OF EMOTIONS: Some Contrasting Views

Emotions: Reactions consisting of physiological reactions, subjective cognitive states, and expressive behaviors.

Among the many theories of emotion that have been proposed, three have been most influential. These are known, after the scientists who proposed them, as the *Cannon-Bard*, *James-Lange*, and *Schachter-Singer* theories. A fourth theory—the *opponent-process theory*—offers additional insight into the nature of emotion and so is also deserving of our attention.

THE CANNON-BARD AND JAMES-LANGE THEORIES: WHICH COMES FIRST, ACTION OR FEELING? Imagine that in one of your courses, you are required to make a class presentation. As you walk to the front of the room, your pulse races, your mouth feels dry, and you can feel beads of perspiration forming on your forehead. In short, you are terrified. What is the basis for this feeling? Sharply contrasting answers are offered by the Cannon-Bard and James-Lange theories of emotion.

Let's begin with the **Cannon-Bard theory**, because it is consistent with our own informal observations of our emotions. This theory suggests that various emotion-provoking events induce *simultaneously* the subjective experiences we label as emotions and the physiological reactions that accompany them. Thus, in the situation just mentioned, the sight of the audience and of your professor, pen poised to evaluate your performance, causes you to experience a racing heart, a dry mouth, and other signs of physiological arousal *and*, at the same time, to experience subjective feelings you label as fear. In other words, this situation stimulates various portions of your nervous system so that both arousal, mediated by your *autonomic nervous system* (refer to chapter 2), and subjective feelings, mediated in part by your cerebral cortex, are produced.

"DAWN AND HER ALTER EGO" BY MICHELLE PULEO

Can you imagine a life without emotions? Clearly, emotions are a key aspect of being human.

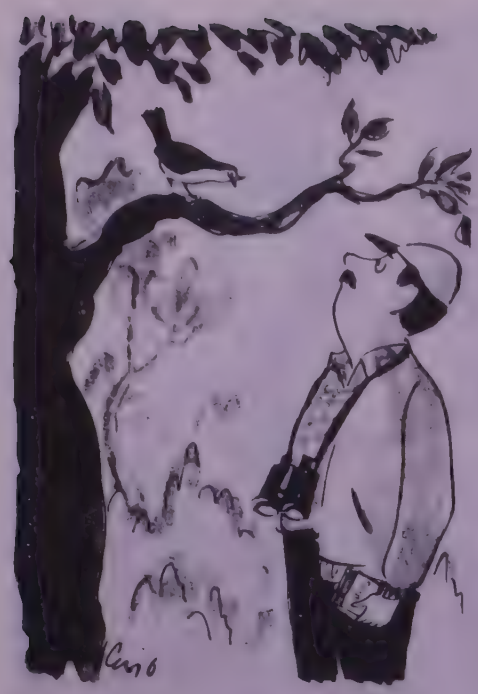
In contrast, the **James-Lange theory** offers a more surprising view of emotion. It suggests that subjective emotional experiences are actually the *result* of physiological changes within our bodies. In others words, you feel frightened when making your speech *because* you notice that your heart is racing, your mouth is dry, and so on. As James himself put it (1890, p. 1066): "We feel sorry because we cry, angry because we strike, and afraid because we tremble."

Which of these theories is closer to the truth? Until recent decades, most psychologists believed that the Cannon-Bard theory was more accurate. They reached this conclusion on the basis of several forms of evidence. First, surgical destruction of the sympathetic nervous system, which plays a key role in the type of physiological reactions James described, did not seem to eliminate emotional reactions (Cannon, Lewis, & Britton, 1927). Second, it appeared that many, if not all, emotional states were accompanied by highly similar patterns of physiological activity. If this was the case, then such activity could not be the basis for distinct emotional experiences such as anger, fear, joy, or sorrow.

More recently, though, the pendulum of scientific opinion has begun to swing the other way, and certain aspects of the James-Lange approach have gained increasing acceptance. Research conducted with highly sophisticated equipment indicates that different emotions are indeed associated with different patterns of physiological activity (Levenson, 1992). For example, in several studies, participants have been asked to recall experiences that evoked various emotions (e.g., Levenson et al., 1991). Careful measurement of processes regulated by the autonomic nervous system, such as heart rate and changes in skin conductance, indicated that different emotions produce contrasting patterns of reactions. In general, unpleasant emotions such as anger, fear, and sadness produce larger heart rate acceleration and larger increases in skin conductance than pleasant ones such as happiness (Levenson, 1992). However, another negative emotion, disgust, produces heart rate *de*celeration. These findings have been replicated with people in their seventies and eighties as well as with young children (Levenson et al., 1991), so they appear to be quite stable and general.

Cannon-Bard Theory: *A theory of emotion suggesting that various emotion-provoking events simultaneously produce subjective reactions labeled as emotions and physiological arousal.*

James-Lange Theory: *A theory of emotion suggesting that emotion-provoking events produce various physiological reactions and that recognition of these is responsible for subjective emotional experiences.*



"I don't sing because I am happy. I am happy because I sing."

THE JAMES-LANGE THEORY IN OPERATION

The James-Lange theory suggests that the bird is correct: The subjective experiences we label as emotions are the result of changes within the body or overt behavior. (*Source:* Drawing by Frascino; © 1991 The New Yorker Magazine, Inc.)

Additional support for the James-Lange theory of emotion is provided by studies of the **facial feedback hypothesis** (Laird, 1984; McCanne & Anderson, 1987). This hypothesis suggests that changes in our facial expression sometimes produce shifts in our emotional experiences rather than merely mirroring them. In other words, as James would suggest, we feel happier when we smile, sadder when we frown, and so on. While there are many complexities in examining this hypothesis, the results of several studies offer support for its accuracy (Ekman et al., 1990; McCanne & Anderson, 1987). So there may be a substantial grain of truth in the James-Lange theory (Zajonc, Murphy, & Inglehart, 1989). Subjective emotional experiences *do* often arise directly in response to specific external stimuli, as the Cannon-Bard view suggests. However, consistent with the James-Lange theory, they can also be generated by changes in and awareness of our own bodily states—even, it appears, by changes in our current facial expressions (Ekman, 1992).

SCHACHTER AND SINGER'S TWO-FACTOR THEORY Strong emotions are a common part of daily life, but how do we tell them apart? How do we know that we are angry rather than frightened, sad rather than surprised? One potential answer is provided by a third theory of emotion. According to this view, known as the **Schachter-Singer theory**, or the *two-factor theory*, emotion-provoking events produce increased arousal (Schachter & Singer, 1962). In response to feelings of arousal, we search the external environment in order to identify the causes of such feelings. The causes we then select play a key role in determining the label we place on our arousal, and so in determining the emotion we experience. If we feel aroused after a near-miss in traffic, we will probably label our emotion as "fear" or perhaps "anger." If, instead, we feel aroused in the presence of an attractive person, we may label our arousal as "attraction" or "love." In short, we perceive ourselves to be experiencing the emotion that external cues, and our processing of them, suggest that we *should* be feeling. The theory is described as a two-factor view because it considers both arousal and the cognitive appraisal we perform in our efforts to identify the causes of such arousal.

Many studies provide support for the Schachter-Singer theory (Reisenzein, 1983; Sinclair et al., 1994). For example, in an intriguing field experiment, Dutton and Aron (1974) arranged to have male hikers meet an attractive female research assistant either while crossing a swaying suspension bridge high above a rocky gorge, or while on solid ground. Later, they asked the men to rate their attraction to the assistant. As the Schachter-Singer theory predicts, those who met her on the swaying bridge, when arousal was high, reported finding her more attractive and were more likely to actually call her for a date than those who met her on solid ground, when arousal was lower. Apparently, the male hikers interpreted their feelings of arousal as attraction to the accomplice—feelings that in her absence they might well have labeled as simple fear. Please see the **Key Concept** page for an overview of the Cannon-Bard, James-Lange, and Schachter-Singer theories.

Facial Feedback Hypothesis: *A hypothesis indicating that facial expressions can influence as well as reflect emotional states.*

Schachter-Singer Theory *(two-factor theory): A theory of emotion suggesting that our subjective emotional states are determined, at least in part, by the cognitive labels we attach to feelings of arousal.*

Opponent-Process Theory of Emotion: *A theory suggesting that an emotional reaction to a stimulus is followed automatically by an opposite reaction.*

OPPONENT-PROCESS THEORY: ACTION AND REACTION TO EMOTION Have you ever noticed that when you experience a strong emotional reaction, it is soon followed by the opposite reaction? Thus, elation is followed by a letdown, and anger is followed by calm, or even by regret over one's previous outbursts. This relationship is an important focus of the **opponent-process theory of emotion** (Solomon, 1982). The theory has two central assumptions: (1) Emotional reactions to a stimulus are followed automatically by an opposite reaction; and (2) repeated exposure to a stimulus causes the initial reaction to weaken and the opponent process, or opposite reaction, to strengthen.

Key Concept

Three Major Theories of Emotion

Cannon-Bard Theory

- Emotion-provoking events or stimuli (e.g., watching or participating in an exciting sports event) stimulate the nervous system.
- This stimulation results in physiological reactions (e.g., faster pulse and higher blood pressure).
- Simultaneously, this stimulation also produces the subjective cognitive states we label emotions (e.g., anxiety, joy, anger).

James-Lange Theory

- Emotion-provoking events (e.g., watching or participating in an exciting sports event) produce physiological reactions (e.g., faster pulse, higher blood pressure, increased perspiration).
- Our awareness of these reactions results in the subjective cognitive states we label emotions (e.g., anger, joy, fear). That is, we feel frightened because we notice that our heart is racing, our mouth is dry, the palms of our hands are wet, and so on.

Schachter-Singer Two-Factor Theory

- Emotion-provoking events (e.g., watching or participating in an exciting sports event) produce increased arousal.
- In response to this state of increased arousal, we search the external environment to identify possible causes for it (especially in situations where several potential causes exist).
- The emotions we experience depend on the causes we choose.

Event

Exposure to emotion-provoking events is the starting point for all major theories of emotion.

Emotions

Athletes in an emotion-provoking situation such as a close, hard-fought game have little doubt about the causes of the arousal they experience. In many other situations, however, the causes of arousal will be far less obvious.

Key Points

- The Cannon-Bard theory of emotion suggests that emotion-provoking events simultaneously elicit physiological reactions and the subjective cognitive states we label as emotions.
- The James-Lange theory contends that emotion-provoking stimuli induce physiological reactions and that these form the basis for the subjective cognitive states we label as emotions.
- The Schachter-Singer (two-factor) theory suggests that when we are aroused by emotion-provoking stimuli, we search the external environment for the causes of our feelings of arousal. The causes we select then determine the emotions we experience.
- According to opponent-process theory, strong emotional reactions are followed by opposite emotional reactions.

So, for example, a politician who initially enjoys making speeches in public may experience a severe letdown after each speech is finished. With repeated experiences in delivering speeches, the pleasure she feels at addressing large crowds may weaken, while the letdown intensifies or occurs sooner after the speech is over. The result: she may gradually cut down on her public-speaking engagements.

Opponent-process theory provides important insights into drug addiction. For example, heroin users initially experience intense pleasure followed by unpleasant sensations of withdrawal. With repeated use of the drug, the pleasure becomes less intense, and unpleasant withdrawal reactions strengthen (Marlatt et al., 1988). In response, addicts begin to use the drug not for the pleasure it provides but to avoid the negative feelings that occur when they *don't* use it. In sum, according to opponent-process theory, emotional reactions often occur in action-reaction cycles, and many forms of behavior can be interpreted within this framework.

The Physiology of Emotion

As you may recall from chapter 2, the physiological reactions that accompany emotions are regulated by the two parts of the *autonomic nervous system*. That is, activation of the *sympathetic* nervous system readies the body for vigorous activity, producing such reactions as increases in heart rate, blood pressure, and respiration. In contrast, activation of the *parasympathetic* nervous system influences activity related to restoration of the body's resources. For example, blood is diverted away from large muscles and to the digestive organs, and digestion itself is facilitated. As we saw earlier, research findings indicate that different emotions are associated with somewhat different patterns of physiological reactions; so the fact that emotions such as anger, joy, and disgust feel very different subjectively does appear to be mirrored, to some degree, in different biological reactions.

In addition, growing evidence suggests that different emotions are related to contrasting patterns of activation in the cerebral cortex (Davidson, 1992). For more than a hundred years, medical reports have indicated that persons who experience damage to the left hemisphere often develop deep depression, while those with damage to the right hemisphere show euphoria (Robinson et al., 1984). These cases suggest that positive feelings may be centered primarily in the left hemisphere, while negative ones are centered in the right hemisphere. And recent studies using recordings of electrical activity in the brain (EEGs; see chapter 2) tend to confirm this possibility. When watching films designed to elicit happiness or amusement, study participants generally show greater activation in the left than in the right cortex. In contrast, when watching films designed to elicit disgust, they show greater activation in the right cortex (Davidson, 1992; Tomarken, Davidson, & Henriques, 1990). Similar findings have even been obtained with infants less than three days old: They show greater right-side activation in response to unpleasant tastes and greater left-side activation in response to pleasant ones (Davidson & Fox, 1988).

Large individual differences in these patterns exist. For example, depressed persons show less left-frontal activation than nondepressed persons (Henriques & Davidson, 1991). Further, the inhibited children discussed in chapter 8 (those who are shy and unwilling to approach new objects or situa-

tions) show less left-frontal activation than uninhibited children (ones who are not shy, and who are willing to approach unfamiliar objects and people) (Davidson et al., 1991).

Together, these findings suggest that the cerebral hemispheres show a degree of specialization with respect to emotions. Positive feelings such as happiness are associated with greater activation in the left hemisphere, while negative ones such as sadness or disgust are associated with greater activation in the right hemisphere. So in brain activity as well as in heart rate and other bodily processes, there appear to be strong correspondences between our subjective emotional experiences and our physiological reactions. Mind and body are indeed one, or least intimately interlinked, as psychologists have long assumed. However, the task of deciphering the complex links between them can be accomplished only by continued thorough scientific research.

Can physiological differences among the emotions be put to practical use? For information on this topic, please see the **Point of It All** section below.

The Point of It All

Can Physiological Reactions Be Used to Detect Lies?

Research findings indicate that different emotions are associated with contrasting patterns of physiological reactions and brain activity (Davidson, 1992; Levenson, 1992). If this is the case, then an interesting possibility follows: Since people often experience different emotions when lying than when telling the truth, perhaps we can use contrasting patterns of physiological reactions to assess the truthfulness of what people say. This is the central concept behind the use of *polygraphs*, or "lie detectors"—devices that record several different physiological reactions at once. The idea is that lying is more emotionally exciting than telling the truth. So if individuals show greater arousal in responding to questions about which they might be expected to lie than in responding to questions about which they have no reason to lie, perhaps it indicates that they are indeed lying. For example, suppose, using a standard lie-detector procedure known as the *control question technique*, we ask a woman suspected of a crime whether she actually committed it. She answers "No," and the needles on the polygraph show a large reaction. In contrast, when asked such *control questions* as "Have you ever lied to another person?" her reactions are much smaller. Since the reaction to the key, or *relevant*, question is larger, it might be concluded that she is lying. In contrast, innocent persons, who know they did not commit the crime, might well show a larger reaction to the control question (Saxe, 1994).

Can deception be separated from truth in this fashion? There are several grounds for considerable doubt that it can. First, so-called lie detectors really measure only *arousal*; the relationship of arousal to lying remains uncertain. Similarly, people can and do influence their physiological reactions in many ways (Lykken, 1985; Zajonc & McIntosh, 1992). For example, they can tense their muscles or change their rate of breathing. These actions and many others can change the pattern of recordings on the lie detector, yet they may have no connection to the truth of what is being said. Finally, differential reactions by persons lying and persons telling the truth would be expected to occur only to the extent that both groups believe that the polygraph works—that it really can determine whether their answers are honest or dishonest (Saxe, 1994). Since

Lie Detectors: A Reliable Measure of Truth?

Lie detectors measure changes in physiological reactions during questioning. The pattern of such changes supposedly reveals the truthfulness of a person's answers. However, growing evidence indicates that lie detectors are not reliable in determining truth.

belief in the efficacy of lie detectors varies greatly across different persons, this is another important reason for doubting the usefulness of polygraph tests.

Recognizing such problems, the U.S. Congress outlawed the use of polygraph testing as a means of selecting employees (although a few businesses, such as ones providing security guards, are excluded). Further, many states have banned the use of lie detectors as evidence in court proceedings. While most psychologists concur with these actions and believe that polygraphs are of doubtful value in separating lies from truth, some research findings suggest that their accuracy can be increased through the use of improved procedures. In one of these, known as the *directed lie technique*, the persons being tested are instructed to lie in response to control questions so that comparisons can be made between truthful and deceitful responses. Under these conditions, it is expected that innocent persons will show larger reactions when lying in response to control questions than will guilty persons. Some research findings suggest that the accuracy of polygraph tests is indeed increased by these procedures (Honts, 1994). Still, despite such findings, most psychologists remain skeptical about the overall value of lie detectors, and continue to believe that using them to separate truth from deception can be a very risky business.

The External Expression of Emotion: Outward Signs of Inner Feelings

Emotions are a private affair. No one, no matter how intimate with us they are, can truly share our subjective experiences. Yet we are able to recognize the presence of various emotions in others, and we are able to communicate our own feelings to them as well. How does such communication occur? A large part of the answer involves **nonverbal cues**—outward, observable signs of others' internal emotional states.

Nonverbal Cues: The Basic Channels Several decades of research on nonverbal cues suggests that this kind of communication occurs through several basic *channels* or paths simultaneously. The most revealing of these consist of *facial expressions, eye contact, body movements and posture,* and *touching*.

Unmasking the face: Facial expressions as guides to others' emotions. More than two thousand years ago, the Roman orator Cicero stated, "The face is the image of the soul." By this he meant that feelings and emotions are often reflected in the face and can be read there from specific expressions. Modern research suggests that Cicero, and many other observers of human behavior, were correct in this belief: It *is* possible to learn much about others' current moods and feelings from their facial expressions. In fact, it appears that six different basic emotions are represented clearly, and from an early age, on the human face: anger, fear, sadness, disgust, happiness, and surprise (Ekman, 1992). Of course, this in no way implies that we are capable of showing only six different facial expressions. On the contrary, emotions occur in many combinations—for example, anger along with fear or surprise combined with happiness. Further, each emotion can vary greatly in intensity. Thus, while there are only a small number of basic themes in facial expressions, the number of variations on these themes is very large.

Nonverbal Cues: Outward signs of others' emotional states. Such cues involve facial expressions, eye contact, and body language.

Until recently, it was widely assumed that basic facial expressions such as those for happiness, anger, or disgust are universal: They are recognized as indicating specific emotions by persons all over the world (e.g., Ekman &

Friesen, 1975). However, a recent review of the evidence on this issue (Russell, 1994) suggests that the interpretation of facial expressions may be strongly influenced by cultural factors and that recognition of them may not be as universal as was previously assumed. In short, it appears that we must be cautious in assuming that, for example, a smile will be seen as a sign of happiness by people in cultures everywhere in the world.

Gazes and stares: The language of the eyes. Have you ever had a conversation with someone wearing dark glasses? If so, you know that this can be an uncomfortable situation. When you can't see the other person's eyes, you can't tell how she or he is reacting. Taking note of the importance of cues provided by others' eyes, ancient poets often described the eyes as "windows to the soul," and in one important sense they were right. We *do* often learn much about others' feelings from their eyes. For example, we interpret a high level of gazing from another as a sign of liking or friendliness (Kleinke, 1986). In contrast, if others avoid eye contact with us, we may conclude that they are unfriendly, don't like us, or are shy (Zimbardo, 1977).

While a high level of eye contact from others is usually interpreted as a sign of liking or positive feelings, there is one important exception to this general rule. If another person gazes at us continuously and maintains such contact regardless of any actions we perform, she or he can be said to be *staring*. Stares are often interpreted as a sign of anger or hostility, and most people attempt to minimize exposure to this particular kind of nonverbal cue if this is possible (Ellsworth & Carlsmith, 1973).

Body language: Gestures, posture, and movements. Try this simple demonstration: Try to remember some incident that made you angry—the angrier the better. Think about it for a minute. Now bring another incident to mind—one that made you feel sad—again, the sadder the better. Now compare your behavior as you recalled the two events. Did you change your posture or move your hands, arms, or legs as your thoughts shifted from the first incident to the second? The chances are good that you did, for our current mood or emotion is often reflected in the posture, position, and movement of our body. Together, such nonverbal behaviors are termed **body language**, and they can provide several useful kinds of information about others' emotions.

First, frequent body movements—especially ones in which a particular part of the body does something to another, such as touching, scratching, or rubbing—suggest emotional arousal. The greater the frequency of such behavior, the higher a person's level of arousal or nervousness seems to be (Harrigan, 1987). The specific movements made, too, can be revealing. Consider the statements "He adopted a *threatening posture*" and "She greeted him with *open arms*." They indicate that different body orientations or postures are suggestive of particular emotional states.

Direct evidence that body postures are often interpreted in this manner is provided by research conducted by Aronoff, Woike, and Hyman (1992). These researchers first identified characters in classical ballet who played dangerous or threatening roles (for example, the Angel of Death or Macbeth) or warm, appealing roles (Juliet, Romeo). Then, they carefully examined samples of dancing by these characters in actual ballets to see if they adopted contrasting postures. Aronoff and his colleagues predicted that the threatening characters would use angular or diagonal poses more often than the friendly characters, and the friendly characters would adopt curving or rounded poses more often than the threatening characters. Both of these predictions were confirmed. Indeed, the threatening characters used diagonal poses three times as often as the friendly characters, and the friendly characters adopted rounded poses

Body Language: *Nonverbal cues involving body posture or movement of body parts.*

almost four times as often as the threatening characters. These and related findings suggest that large-scale body movements or postures can sometimes serve as an important source of information about others' emotions.

Finally, more specific information about others' feelings is often provided by **gestures** or *emblems*, body movements carrying a highly specific meaning in a given culture. For example, in several countries, holding one's hand with the thumb pointing up is a sign of "Okay." Similarly, seizing one's nose between the thumb and index finger is a sign of displeasure or disgust. Emblems vary greatly from culture to culture, but all human societies seem to have at least some signals of this type for greetings, departures, insults, and the descriptions of various physical states—"I'm full," "I'm tired," and so on.

Touching: The most intimate nonverbal cue. Suppose that while you were talking with another person, she or he touched you briefly. What information would this convey? How would you react? The answer to both questions is "It depends." And what it depends on is several factors relating to who does the touching—a friend or a stranger, a member of your own or of the other gender; the nature of the touching—brief or prolonged, gentle or rough; and the context in which it takes place—a business or social setting, a doctor's office. Depending on such factors, touch can suggest affection, sexual interest, dominance, caring, or even aggression. Despite these complexities, growing evidence indicates that when one person touches another in a manner that is considered acceptable in the current context, positive reactions generally result (Alagna, Whitcher, & Fisher, 1979; Smith, Gier, & Willis, 1982). Consider, for example, the results of an ingenious study by Crusco and Wetzel (1984).

These investigators enlisted the aid of waitresses who agreed to treat customers in one of three different ways when giving them their change: They did not touch the customers in any manner, they touched them briefly on the hand, or they touched them for a longer period of time on the shoulder. The researcher assessed the effects of these treatments by examining the size of the tips the customers left. Results were clear: Both a brief touch on the hand (about one-half second) and a longer touch on the shoulder (one to one and a half seconds) significantly increased tipping over the no-touch control condition. Assuming that tips increase when customers are in a positive mood, these findings are consistent with the view that being touched in a nonthreatening, appropriate manner tends to generate positive reactions.

One final point about touching: Additional studies indicate that there are important *gender differences* in this area. In a field study, Hall and Veccia (1990) observed touching between thousands of persons in many public settings—shopping malls, hotel lobbies, airports. Results indicated that overall, there was no difference between females and males in frequency of touching others. However, the investigators noted that among young persons, males touched females more often than vice versa. This difference decreased with age, and by middle age, females actually touched males more often than males touched females.

What accounts for these age-related shifts? Hall and Veccia (1990) suggest that among younger persons especially teenagers, relationships are not yet well established; and in such cases, existing gender roles encourage visible gestures of possessiveness by males. As relationships develop, however, gender roles may require more gestures of possessiveness by females. Whatever the explanation for the age reversal observed by Hall and Veccia, it is interesting to note

BODY POSTURES AND EMOTIONS

Threatening characters in classical ballet adopt angular or diagonal poses such as the one on the left much more often than friendly characters do. In contrast, friendly characters adopt rounded poses such as the one on the right much more often than threatening characters do. These findings indicate that specific postures or movements can often be a useful guide to others' emotions.

KEY POINTS

- Research findings indicate that different emotions are associated with different physiological reactions and patterns of brain activity.
- Positive emotional reactions are associated with greater activation of the left cerebral hemisphere, while negative emotional reactions are associated with greater activation of the right cerebral hemisphere.
- Emotional states are communicated to others through a wide range of nonverbal cues, including facial expressions, eye contact, body language, and touching. .

that across all ages, there appear to be no overall gender differences in touching in public settings.

Emotion and Cognition: How Feelings Shape Thoughts and Thoughts Shape Feelings

Earlier, I asked you to remember incidents that made you feel angry and sad When you thought about these incidents, did your mood also change? Did recalling memories of these events influence the way you felt? The chances are good that it did, for in many instances, our thoughts seem to exert strong effects on our emotions. This relationship works in the other directions as well. Being in a happy mood often causes us to think happy thoughts, while feeling sad tends to bring negative memories and images to mind. In short, there appear to be important links between *emotion* and *cognition*—between the way we feel and the way we think. Let's take a brief look at some of the scientific evidence for the reality—and the importance—of these links (e.g., Forgas, 1991; in press).

How Affect Influences Cognition Does **affect**, our current mood, influence the way we think; that is, how we process information about ourselves or the external world? The findings of many different studies indicate that our current moods do indeed influence many aspects of cognition. First, it has been found that our moods, or *affective states* as they are often termed (Isen, 1987), strongly influence our perception of ambiguous stimuli. In general, we perceive and evaluate these stimuli more favorably when we are in a good mood than when we are in a negative one (e.g., Fiske & Neuberg, 1990; Isen & Shalker, 1982). For example, when asked to interview applicants whose qualifications for a job are ambiguous, research participants assign higher ratings to applicants when in a positive mood (such as when they have just received favorable feedback or won a small prize) than when they are in a negative mood (when they have just received negative feedback) (Baron, 1987, 1993).

Second, positive and negative moods exert a strong influence on memory. In general, information consistent with our current mood is easier to remember than information inconsistent with it (Forgas, 1991). Positive and negative affect have also been found to influence the way in which information is organized in memory. Persons experiencing positive affect seem to include a wider range of information within various memory categories than do persons in a neutral or negative mood (Isen & Daubman, 1984). Those experiencing positive affect also provide more unusual associations to neutral words and rate objects that are not very typical of a given category as more representative of it than do persons who are not in a positive mood. For example, they rate the word *elevator* as more typical of the category "vehicle" than do persons in a negative mood (Baron, Rea, & Daniels, 1992; Isen et al., 1985).

Third, our current moods often influence the process of decision making. Would you be more willing to adopt relatively risky courses of action when in a good mood or when in a bad mood? Informal observation suggests "when in a good mood." Research findings, however, indicate that the situation is a bit more complicated than this. Persons experiencing positive affect are indeed more likely to make risky decisions, but only when the potential losses involved are small or very unlikely to occur (Arkes, Herren, & Isen, 1988). They are actually *less* willing to take risks when potential losses are important or likely to occur—perhaps because they don't want to take a chance on reducing their current positive feelings.

Gestures: *Movements of various body parts that convey a specific meaning to others.*

Affect: *A person's current mood.*

Finally, persons in a good mood are sometimes more creative than those in a negative mood. They are more successful in performing tasks involving creative problem solving, such as coming up with novel uses for everyday objects, than are persons in a neutral mood (Isen, Daubman, & Nowicki, 1987).

Overall, then, it seems clear that emotions, or even relatively minor shifts in current moods, can strongly influence important aspects of cognition. But what about our overall capacity to engage in cognitive tasks—to think clearly and rationally, for example? Does mood influence this as well? For some revealing—and thought-provoking—information on this issue, please see the **Research Process** section below.

The Research Process

Are People in a Good Mood Easier to Influence? Effects of Mood on Information Processing

People seeking to influence others—to change their attitudes—often follow a strategy that goes something like this: "Put them in a good mood first, then try to persuade them." You've probably observed this strategy yourself, when salespersons complimented you or joked with you in an effort to put you in a good mood and to soften you up for the pitch to follow. Is this strategy effective? An information-processing perspective suggests that it may work because: (1) we have limited capacity to process new information, and (2) being in a good mood might absorb some of this capacity and so reduce our ability to defend ourselves against efforts at persuasion.

Evidence consistent with this reasoning was reported by Mackie and Worth (1989). In their study, male and female participants read a persuasive message on a computer screen that argued against their own views (whatever these were) concerning two issues: government control over gun sales, and acid rain. Half of the participants read these messages after experiencing an event designed to put them in a good mood (they learned that they had been chosen to receive a small cash prize); the remainder never received such mood-enhancing information. Within each of these two conditions, the positive mood and the neutral mood, half of the participants received *strong* arguments in favor of a view different from their own, while the remainder received *weak* arguments. Finally, half were told that they could look at the persuasive message for as long as they wished; the remainder learned that they could look at it only long enough to read it once.

After reading the messages, subjects reported their attitudes toward each issue. Mackie and Worth (1989) predicted that those in a positive mood would be less able to engage in careful processing of the arguments they read, because mood would absorb part of their information-processing capacity. Thus, they would be less successful in formulating counterarguments against the strong messages and would be influenced by them to a greater extent under conditions where they had only limited time to read them. (If they had unlimited time, Mackie and Worth reasoned, mood would have little effect on persuasion.) Results confirmed these predictions. On the basis of these and related findings, many psychologists concluded that being in a good mood does indeed reduce our capacity to process incoming information (e.g., DeBono, 1992).

Motivational Effects of Positive Affect: Does Positive Affect Really Interfere with Our Ability to Process Information?

Mackie and Worth (1989) interpreted their findings as suggesting that people in a good mood are less *able* to process information than those in a neutral mood. While this interpretation is certainly consistent with their results, there may be an alternative explanation. Perhaps people in a good mood are still able to process information effectively but are less *motivated* to do so. They may be unwilling to engage in the hard cognitive work that will interfere with their good mood; they may prefer instead to focus on pleasant activities that help them maintain this mood.

To test this possibility, Smith and Shaffer (1991) conducted a series of integrated studies. In the first of these, they argued that if being in a good mood reduces motivation rather than capacity to process new information, then the *relevance* of the message may make an important difference. Specifically, when a persuasive message is highly relevant and important to people in a good mood, they may process this information as effectively as those in a neutral mood. When message relevance is low, in contrast, people in a good mood may be less motivated to process it than those in

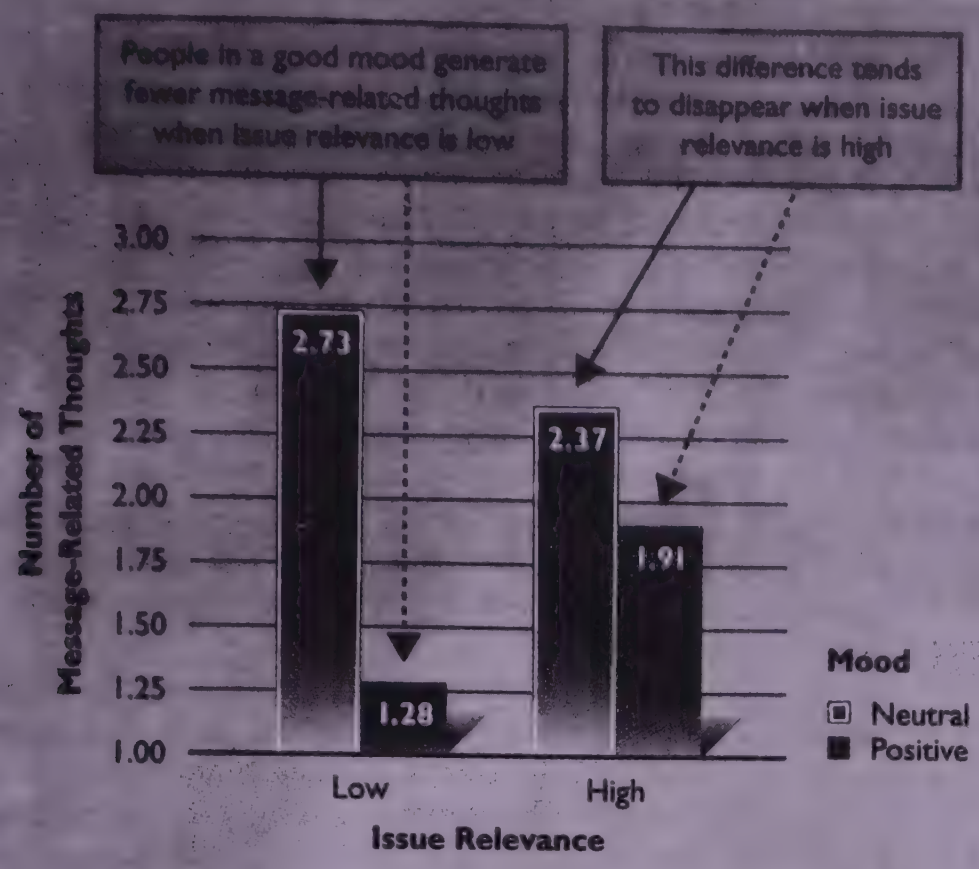


FIGURE 10.8

Positive Affect and Information Processing

When issue relevance was low, persons in a good mood generated fewer thoughts related to a persuasive message than persons in a neutral mood. However, when issue relevance was high, this difference tended to disappear. These findings suggest that persons in a good mood are able to process information effectively, but are sometimes less motivated to do so than are persons in a neutral mood. (*Source:* Based on data from Smith & Shaffer, 1991.)

a neutral mood, and so tend to be more influenced by it. To investigate this hypothesis, Smith and Shaffer asked two groups of college students to listen to a brief message arguing in favor of comprehensive examinations for seniors. In the *high-relevance* condition, the message argued for implementing these exams the following year, when the participants would still be on campus; in the *low-relevance* condition, the message argued for starting the exams in five years, long after the participants would have graduated. Half of the persons in each group were placed in a positive mood before hearing the message by watching a video known to induce a good mood; the other half watched a video known to have little if any effect on mood.

After listening to one of these messages about examinations, participants rated their agreement with the message and listed all the thoughts they had while listening to it. Careful analysis indicated that when issue relevance was low, those in a good mood remembered less of the message and generated fewer message-related thoughts, including counterarguments, than those in a neutral mood. When issue relevance was high, in contrast, these differences disappeared: Being in a good mood did *not* interfere with information processing (see Figure 10.8).

Taking available information into account (Bless et al., 1990; DeBono, 1992; Mackie & Worth, 1989; Smith & Shaffer, 1991), then, it appears that being in a good mood can indeed interfere with our processing of new information. However, such effects may stem from reduced motivation to engage in careful processing rather than from the fact that positive affect absorbs precious information-processing capacity. In short, perhaps people in a good mood are able to process information but, wishing to maintain their positive feelings, are less willing to do so.

CRITICAL THINKING QUESTIONS

1. Suppose that Mackie and Worth (1989) found that being in a good mood increased persuasion even when the arguments presented were weak. What would this imply concerning the effects of mood on information processing?
2. Have you ever had trouble concentrating on difficult tasks when you felt elated? If so, why do you think you experienced such problems? Do your subjective impressions seem more consistent with the reduced capacity or with the motivational interpretation discussed above?
3. Is it possible that being in a good mood increases susceptibility to persuasion both by absorbing information capacity *and* by reducing motivation? How could this possibility be tested?

How Cognition Influences Affect Most research on the relationship between affect and cognition has focused on how feelings influence thought. However, there is also compelling evidence for the reverse—the impact of cognition on affect. I mentioned one aspect of this relationship in discussing the two-factor theory of emotion (Schachter & Singer, 1962). This is the theory that suggests that often we don't know our own emotions directly; rather, since our internal reactions are often somewhat ambiguous, we look outward—at our own behavior or other aspects of the external world—for clues about what we are feeling. In such cases, the emotions or feelings we experience are strongly determined by the interpretation or cognitive labels we select.

A second way in which cognition can influence emotions is through the activation of *schemas* containing a strong affective component. For example, if we label an individual as belonging to some group, the schema for this social category may suggest what traits she or he probably possesses. In addition, it may also tell us how we *feel* about such persons. Thus, activation of a strong racial, ethnic, or religious schema or *stereotype* may exert powerful effects on our current feelings or moods.

Third, our thoughts can often influence our reactions to emotion-provoking events by determining how we interpret or appraise those events. For example, imagine that you are standing in line outside a theater and a woman bumps into you. Will you react with anger? This depends strongly on your interpretation of her act. If you decide that she is trying to shove you, the chances are high that you will become angry. If, instead, you conclude that she merely tripped on the sidewalk, you probably won't experience such feelings or take defensive action.

Finally, consider the impact of *expectancies* on our emotional reactions. Growing evidence indicates that when individuals hold expectations about how they will react to a new event or stimulus, these expectations shape their perceptions of and feelings about the event or stimulus when it actually occurs (e.g., Wilson et al., 1989). Thus, if you expect to dislike a new food, you probably will. If you expect to enjoy a film or a joke, the chances are good that you will have positive reactions to these stimuli when you actually encounter them. Perhaps even more surprising, expectations can even shape our later memories of how we felt about events. A dramatic illustration of such effects is provided by a study conducted by Wilson and Klaaren (1992).

They phoned some persons who had signed up to participate in an experiment and told them that it was a lot of fun, but they did not give other participants these positive expectations. When the participants arrived for the study, half the people in each group watched a film under pleasant conditions (they sat in a comfortable chair). The others watched the same film under unpleasant conditions (they sat in a hard chair and were required to keep their chin on a headrest). Three to four weeks later, all participants were phoned and asked if they would be willing to be in the study once again. Results indicated that expectations played a key role in participants' responses. Those who had expected to enjoy the film were significantly more likely to volunteer again, *regardless of whether they had participated under pleasant or unpleasant conditions*. Wilson and Klaaren (1992) interpreted these findings as indicating that expectations may sometimes override actual experience; indeed, in an important sense, expectations may *become* our reality! In such cases, one aspect of cognition is a more important determinant of our emotions than reality itself.

Key Points

- We tend to remember information consistent with our moods more readily than information inconsistent with them.
- Positive and negative moods influence decision making, and positive moods can sometimes increase creativity.
- Positive affect may increase susceptibility to persuasion by reducing motivation to engage in careful information processing, thus preventing us from formulating counterarguments.
- Cognition influences affect in several ways. Activation of schemas that contain an affective component can strongly influence our current moods or emotions.
- Our interpretations of potentially emotion-provoking events can strongly influence our emotional reactions to them.
- Expectancies exert strong effects on emotional reactions, and may even alter memories of actual experiences.

Making Psychology Part of Your Life

Getting Motivated: Some Practical Techniques

At one time or another, almost all of us feel that getting motivated to do the things we should do is difficult if not impossible. Are there any techniques you can use to help overcome this kind of *behavioral inertia*? As we'll see in chapter 17, industrial/organizational psychologists have focused a great deal of attention on this question in the context of *work motivation*—the motivation to perform various tasks. The results of their research suggest that one technique is especially helpful: *goal setting*, or establishing specific levels of performance or achievement that individuals should strive to attain (Locke & Latham, 1990). You probably already use goal setting informally, but here are several guidelines that will help you maximize its benefits.

1. *Set specific goals.* First, be careful to set very specific goals. This means indicating precisely what will be defined as adequate performance. For example, if you are preparing for an exam, don't set yourself the general goal of "reading all the material twice." Instead, decide how many pages you must read *each day* in order to be ready for the test. Then be sure to stick to this specific goal.

2. *Set challenging goals.* Don't fall into the trap of setting your goals so low that meeting them is trivial. People seem to be motivated to a much greater extent by goals that are challenging than by ones that are too easy to attain. So set your goals high enough that they stretch your ability to reach them.

3. *Set attainable goals.* But don't fall into the opposite trap—setting your goals so high that you can't possibly reach them. When this happens, it's easy to get discouraged and give up. The trick is to choose goals that are difficult enough to present a challenge but not so difficult that failure is guaranteed. Remember the discussion of achievement motivation? High achievers tend to prefer goals of moderate but not excessive difficulty; you should, too.

4. *Reward yourself for reaching each goal.* Often, people forget to reward themselves for reaching each goal. As soon as one goal is attained, they rush full steam ahead to the next one. This is a mistake! When choosing your goals, also identify rewards you will give yourself for reaching them. For example, in studying for a test, plan to give yourself a break, a candy bar, or some other treat after you finish each chapter. Doing so can be a big help in terms of keeping your momentum going.

5. *Become committed to your goals.* Once you establish your goals, it's important you accept them as *goals*—ones you are really committed to reaching. If you don't have such commitment, it's too easy to change the goals, to ignore them, or, again, just to give up altogether. So be sure to adopt your goals as ones you are committed to reaching, as real standards for your behavior.

6. *Build feedback into the process.* A final question you should ask yourself before you begin is this: "How will I know when I've reached each goal?" This sounds simple, but in some instances it's more complicated than it seems. For example, in writing a term paper, you can set a specific goal, such as "I'll do five pages each night." In this case the feedback is obvious: You know you've reached the goal when you have a pile of five completed pages in front of you. But for other tasks you may have to turn to other persons for feedback. For example, suppose that you've decided to work on getting along better with your roommate. How will you know when you've made real progress? One way is to set very specific goals, such as "I won't get into arguments over the groceries, or over cleaning the apartment." But it may also be necessary to ask the roommate directly whether she or he perceives any changes in your behavior. The main point is that feedback is essential for goal setting to work, so be sure to build this kind of information into the process.

Industrial/organizational psychologists have studied techniques for helping people increase their motivation, in both their work and their personal lives.

Summary and Review of Key Points

Motivation: The Activation and Persistence of Behavior

Key Terms:

motivation, p. 375
instinct theory, p. 375
instincts, p. 375
drive theory, p. 375
homeostasis, p. 375
arousal theory, p. 376
expectancy theory, p. 377
incentives, p. 377
work motivation, p. 378
hierarchy of needs, p. 378
hunger motivation, p. 380
obesity, p. 382
anorexia nervosa, p. 382
bulimia, p. 382
body-mass index, p. 383
sexual motivation, p. 385
gonads, p. 385
sexual jealousy, p. 388
homosexual, p. 390
bisexual, p. 390
heterosexual, p. 390
aggressive motivation, p. 391
aggression, p. 391
frustration, p. 392
achievement motivation, p. 394
power motivation, p. 394
Thematic Apperception Test (TAT), p. 395
intrinsic motivation, p. 396

- The concept of motivation is helpful in explaining behavior that can't readily be interpreted in terms of current conditions in a given situation. Drive theory suggests that motivation is basically a process in which various biological needs push (drive) us to actions designed to satisfy these needs. Arousal theory suggests that organisms seek optimal levels of arousal, not minimal levels of arousal. Expectancy theory suggests that behavior is often motivated by expectancies concerning the outcomes that will result from specific actions. Maslow's needs hierarchy theory suggests that needs exist in a hierarchy and that higher-level needs cannot be activated, or serve as sources of motivation, until lower-level needs have been satisfied.
- Eating is regulated by complex biochemical systems within the body. Eating is also affected by the sight of food, feedback from chewing and swallowing, and cultural factors.
- Many variables contribute to obesity. These include eating habits, reactions to stress, basal metabolic rate, and responses to food-related cues.
- Anorexia nervosa and bulimia are two serious eating disorders. Persons suffering from anorexia starve themselves and experience extreme weight loss. Persons suffering from bulimia engage in binge eating followed by purging. Both anorexics and bulimics are dissatisfied with their bodies and perceive their body size as larger than it actually is.
- Sex hormones seem to play only a subtle and relatively minor role in human sexual motivation. However, other chemicals produced within the body may also play a role in sexual attraction and love. During sexual activity both males and females move through a series of distinct phases. In contrast to other species, humans can be sexually aroused by self-generated sexual fantasies and by exposure to erotic materials.
- Individuals differ in sexual orientation. Some are exclusively homosexual, others are bisexual, and the majority are exclusively heterosexual. Male homosexuals do not have lower testosterone levels than male heterosexuals, and homosexuals and heterosexuals do not seem to differ in terms of family backgrounds or early experiences. Recent evidence suggests that genetic factors may play a role in homosexuality.
- Aggressive motivation involves the desire to inflict harm on others. Contrary to popular belief, aggression does not stem primarily from frustration. Rather, it occurs in reaction to a wide range of social, environmental, and personal factors. Culture, too, influences its occurrence.
- Achievement motivation is the desire to meet standards of excellence: to outperform others and accomplish difficult tasks. Power motivation is the desire to be in charge and to influence others. Contrary to initial findings, women do not fear success, and women are equal to men with respect to achievement motivation.
- When individuals engage in activities because they find them pleasurable rather than to obtain external rewards, they are said to be intrinsically motivated to perform them. Extrinsic rewards can sometimes reduce intrinsic motivation, but this does not always occur if the rewards are perceived as a sign of recognition for good performance. Intrinsic motivation has important implications for education and can sometimes be used to enhance students' learning and performance.

Emotions: Their Nature, Expression, and Impact

Key Terms:

emotions, p. 398
Cannon-Bard theory, p. 399
James-Lange theory, p. 399
facial feedback hypothesis, p. 400
Schachter-Singer theory, p. 400
opponent-process theory of emotion, p. 400
nonverbal cues, p. 404
body language, p. 405
gestures, p. 407
affect, p. 407

- The Cannon-Bard theory of emotion suggests that emotion-provoking stimuli simultaneously elicit physiological arousal and the subjective cognitive states we label as emotions. The James-Lange theory contends that emotion-provoking stimuli induce physiological reactions and that these form the basis for the subjective cognitive states we label as emotions. The Schachter-Singer theory, or two-factor theory, suggests that when we are aroused by emotion-provoking stimuli, we search the external environment for the causes of our feelings of arousal. The causes we select then determine the emotions we experience. According to opponent-process theory, strong emotional reactions are followed by opposite emotional reactions.
- Research findings indicate that different emotions are associated with different physiological reactions and patterns of brain activity. Positive emotional reactions are associated with greater activation of the left cerebral hemisphere, while negative emotional reactions are associated with greater activation of the right cerebral hemispheres.
- Emotional states are communicated through a wide range of nonverbal cues, including facial expressions, eye contact, body language, and touching.
- Persons in a good mood evaluate ambiguous stimuli more favorably than those in a neutral mood. We tend to remember information consistent with our moods more easily than information inconsistent with them. Positive and negative affect also influence decision making, and positive affect can sometimes increase creativity.
- Positive affect may increase our susceptibility to persuasion by reducing our motivation to engage in careful information processing, thus preventing us from coming up with counterarguments.
- Cognition influences affect in several ways. Activation of schemas containing an affective component can strongly influence our current moods or emotions. Our interpretations of potentially emotion-provoking events can strongly influence our emotional reactions to them. Expectancies exert strong effects on emotional reactions and may even alter memories of actual experiences.

Critical Thinking Questions

Appraisal	Ultimately, emotions are a private experience: No one can ever share them with us directly. Despite this fact, psychologists have attempted to investigate emotions scientifically. Do you think a scientific understanding of emotions is possible? If so, why? If not, why?
Controversy	Not long ago, a large U.S. federal agency planned to fund research designed to study the possibility that aggressive tendencies are inherited. Vigorous objections to this plan were voiced by many political groups, fearing that the proposed research would yield findings very unfavorable to minority groups. The plan was shelved. Do you think this was appropriate? Or should the research have been funded, no matter how unpopular its results might be?
Making Psychology Part of Your Life	Now that you understand the basic nature of hunger motivation and the many factors that affect it, can you think of ways you can use this knowledge to regulate your own weight better? Describe at least three concrete steps, based on the research findings discussed in this chapter, you can take to help ensure that your weight stays at desirable levels in the decades ahead.

Individual Differences I:

Intelligence, Gender

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11

When I was in the sixth grade, my teacher launched an ambitious pen-pal project. Each member of the class was given the name and address of a student in England and assigned the task of writing to that person. In our first letter, our teacher told us, we should "Tell your new friend what makes you *you*—what you're like, and how you are different from other girls or boys your age." I don't remember what I put in that letter, but I'm pretty sure what I'd include today. I'd write something like, "I'm very disciplined where my work is concerned, but when I'm not working, I really enjoy life—music, travel, and especially good food. And for me, no meal is complete without dessert. That's no problem, because I never gain weight."

What about you? What would *you* put in a letter to a complete stranger to give that person a clear picture of what you are like as a unique individual? Whatever specific information you decided to include, it would relate to what psychologists

describe as **individual differences**—differences between individuals that distinguish them from one another. As you certainly already know, people differ from each other in countless ways. From a purely biological perspective this is hardly surprising: Human beings possess thousands of genes, and since half of these come from each parent, the number of different ways in which these genes can combine is astronomical—a number in the hundreds of billions, at least. So, from the very start, we really *are* unique individuals.

PEOPLE DIFFER FROM EACH OTHER IN COUNTLESS WAYS.

It's equally clear, however, that some of the dimensions of difference, or ways in which people differ from one another, are more important than others. For this reason, psychologists who study individual differences have generally focused on a relatively small number of key dimensions. In this chapter and the next one, we'll examine several of these dimensions. Chapter 12 will focus on individual differences relating to *personality.* Here, we'll begin our discussion of individual differences by focusing on two important topics: *intelligence* and *gender.*

The term *intelligence* refers primarily to individual differences in a wide range of cognitive abilities, and intelligence is obviously a very important aspect of individual distinctiveness. To acquaint you with what psychology has learned about intelligence during almost a century of careful study, we'll consider several topics: the nature of intelligence, how it's measured, and the potential contributions of heredity and environment to individual differences along this key dimension. After that, we'll turn to another important aspect of individual difference—gender. The term *gender,* defined in chapter 8, refers in part to differences between males and females (Unger, in press). As we'll soon see, however, gender involves much more than differences related to the biological categories of *male* and *female* (Deaux, 1993). Chapter 8 explained that *social factors,* such as a society's ideas about the characteristics of males and females and about what is and is not appropriate behavior for each sex, play a key role too. This chapter's discussion of gender will focus primarily on the following question: What differences between males and females actually exist? In addition, I'll comment briefly on current evidence about the possible origins of such differences.

INTELLIGENCE: Its Nature and Measurement

In everyday life, we make judgments about where other people—and we ourselves—stand along many different dimensions: attractiveness, ambition, patience, charm, and energy, to name just a few. Among these, one of the most important is clearly **intelligence**—the ability to think abstractly and to learn readily from experience (Flynn, 1987). Why do we consider people's relative position along this dimension to be so important? Partly because we believe it predicts many important aspects of behavior: how quickly people can master new information and tasks; how quickly they will understand and adapt to new situations; how successful they will be in school, in various kinds of training, and in life generally. As we'll soon see, these common sense notions are correct, at least to a degree: The higher people score on various measures of intelligence, the better able they are to accomplish many different tasks (Ceci, 1991; Matarazzo, 1992). So, from this perspective, individual differences in intelligence are a very important topic, worthy of careful study.

Individual Differences: *Differences between individuals that distinguish them from one another.*

Intelligence: *The ability to think abstractly and to learn readily from experience.*

Psychologists have recognized this fact for many years. In fact, efforts to understand the nature of intelligence and to measure intelligence were among the first tasks addressed by our field. In this section we'll first consider several contrasting views of the nature of intelligence. Then we'll turn to the question of how this important characteristic can be measured. In this context we'll consider some of the basic requirements of *any* tests designed to assess individual differences in *any* aspect of psychological functioning. Finally, we'll look at the evidence relating to the relative contributions to intelligence of environmental and genetic factors.

Human Intelligence: Some Contrasting Views

What is intelligence? Every person has her or his own definition, and psychologists, too, disagree about this question (e.g., Glazer, 1993; Sternberg, 1985). Most would include in their definitions of intelligence the ability to think abstractly and to learn readily from experience, but beyond these basics, there is little consensus. Let's examine several contrasting views about the nature of intelligence to see how they differ.

Intelligence: Unified or Multifaceted? Is intelligence a single characteristic, or does it consist of several distinct parts? In the past, psychologists who studied intelligence often disagreed sharply on this issue. In one camp were scientists who viewed intelligence as a general, unified capacity—a single characteristic or dimension along which people vary. An early supporter of this view was Spearman (1927), who believed that performance on any cognitive task depended on a primary general factor (which he named *g*) and on one or more specific factors (*s*) relating to that particular task. Spearman based this view on the observation that people who scored high or low on one kind of test of intelligence tended to score at a similar level on other tests, too.

In contrast, other experts believed that intelligence is composed of many separate mental abilities that operate more or less independently. One of the strongest proponents of this position was Thurstone (1938), who suggested that intelligence is a composite of seven distinct primary mental abilities. Included in his list were *verbal meaning*—understanding of ideas and word meanings; *number*—speed and accuracy in dealing with numbers; and *space*—the ability to visualize objects in three dimensions. Thurstone believed that assessment of a person's intelligence required measurement of all seven abilities. Related theories (e.g., Gardner, 1983; Guilford, 1967, 1985) have divided intelligence into different patterns of components, but the basic underlying idea remains the same: Intelligence is *multifaceted*.

Not all views of intelligence divide sharply on the unified/multifaceted issue, however. One influential perspective, proposed by Cattell (1963, 1987), adopts a more integrated approach. According to Cattell, intelligence consists of two major components: *fluid intelligence* and *crystallized intelligence*. As you may recall, we learned about these two types in chapter 9. *Crystallized intelligence* includes those aspects of intelligence that involve drawing on previously learned information to make decisions or solve problems. Classroom tests, vocabulary tests, and many social situations involve crystallized intelligence. In contrast, *fluid intelligence* involves the abilities to form concepts, reason, and identify similarities; it is more intuitive and is active in forming new mental structures rather than in making use of existing ones. Research focusing on these two types of intelligence suggests that fluid intelligence may peak in early adulthood, while crystallized intelligence increases across the life span (Lerner, 1990; Willis & Nesselroade, 1990).

Where does the pendulum of scientific opinion rest today? Somewhere in the middle. Today most psychologists believe that intelligence involves *both* a general ability to handle a wide range of cognitive tasks and problems *and* a number of more specific abilities. In a sense, though, modern thinking about the nature of intelligence has largely moved beyond the unitary-versus-multifaceted issue and now addresses very different questions relating to *information processing*, *neural functioning*, and *culture*.

THE INFORMATION-PROCESSING APPROACH: BASIC COMPONENTS OF INTELLIGENT THOUGHT As we've seen repeatedly in this book, psychologists have applied an *information-processing perspective* to understanding many aspects of human behavior—everything from the nature of memory and cognitive development through key aspects of motivation (see chapters 6, 7, 8, and 10). It is not surprising, then, that this approach has also been applied to understanding the nature of intelligence. According to an information-processing perspective, to understand intelligence, we must understand the cognitive strategies used by individuals who score high or low on this dimension. In other words, we must define intelligence in terms of basic aspects of cognition (Matarazzo, 1992; Naglieri & Das, 1990).

This perspective has already led to important new insights about intelligence. For example, consider a theory proposed by Sternberg (1985, 1986). According to this theory, known as the **triarchic theory** of intelligence, there are actually three types of human intelligence (see Figure 11.1). The first, known as **componential intelligence**, emphasizes effectiveness in information processing. Persons who rate high on this dimension are able to think critically and analytically. Thus, they usually excel on standard tests of academic potential and make excellent students.

In contrast, the second type, **experiential intelligence**, emphasizes insight and the ability to formulate new ideas. Persons who rate high on this dimension excel at zeroing in on what information is crucial in a given situation, and at combining seemingly unrelated facts. This is the kind of intelligence shown by many scientific geniuses and inventors, such as Einstein, Newton, and—some would say—Freud. Johannes Gutenberg, for example, inventor of the moveable type that first made large-scale production of books possible, combined the mechanisms for producing playing cards, pressing wine, and minting coins into his invention (see Figure 11.2).

Finally, there is what Sternberg terms **contextual intelligence**. Persons high on this dimension are intelligent in a practical, adaptive sense. They quickly recognize what factors influence success on various tasks and are competent at both adapting to and shaping their environment. Successful people in many fields excel in this capacity.

Sternberg has also expanded his triarchic theory to bridge the gap between intelligence and personality, the topic we'll consider in the next chapter (Sternberg, 1988, 1989). In this expanded view, known as *mental self-government*, Sternberg notes that in addition to the three types of intelligence described above, we must also consider *intellectual styles*—ways in which the three types are actually used in solving the problems of everyday life. Whether or not Sternberg's theories are confirmed by future research, they are representative of a new approach to the study of intelligence that draws heavily on basic knowledge about cognition generally. Clearly, this is a promising new perspective.

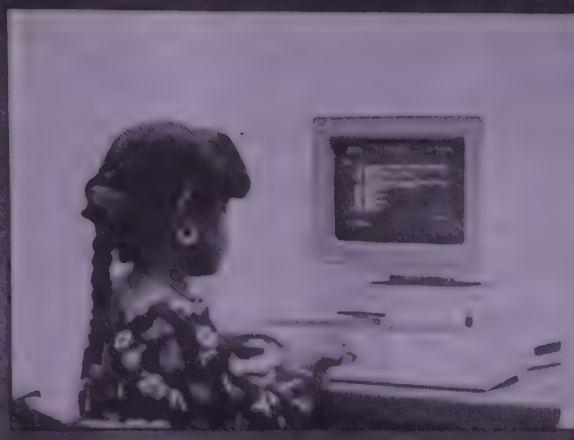
Triarchic Theory: *A theory suggesting that there are actually three distinct kinds of intelligence.*

Componential Intelligence: *The ability to think analytically.*

Experiential Intelligence: *The ability to formulate new ideas or to combine seemingly unrelated information.*

Contextual Intelligence: *The ability to adapt to a changing environment.*

THE NEUROSCIENCE APPROACH: INTELLIGENCE AND NEURAL EFFICIENCY Highly intelligent persons are often described as being "fast thinkers," as responding rapidly to changing situations and new events. This everyday



Componential Intelligence

- Ability to think abstractly and process information
- Tasks that can be used to measure the elements of componential intelligence are analogies, vocabulary, and syllogisms

Experiential Intelligence

- Ability to formulate new ideas and combine unrelated facts
- Examples include scientific creativity and diagnosing a problem with an automobile engine

Contextual Intelligence

- Ability to adapt to a changing environment and to shape one's world to optimize opportunities
- Contextual intelligence deals with an individual's ability to prepare for problem solving in specific situations; for example, this Lapp herder in northern Scandinavia stuffs his boots with dried grasses for warmth

FIGURE 11.1

Sternberg's Triarchic Theory of Intelligence

According to Sternberg's triarchic theory, there are three distinct types of intelligence: *componential, experiential,* and *contextual.*

usage points to another possible perspective on intelligence—one emphasizing neural factors, such as more rapid or efficient processing of information by nerve cells within the brain. And in fact, such an approach has gained increasing attention among psychologists. A growing body of evidence suggests that intelligence may actually be closely linked to physiological processes—especially ones going on in the nervous system and in the brain in particular (e.g., Matarazzo, 1992).

What kind of evidence points to such links? A good illustration is provided by a study conducted recently by Reed and Jensen (1993). These researchers recorded evoked potentials, or electrical responses, in the brains of 147 male volunteers who were

FIGURE 11.2

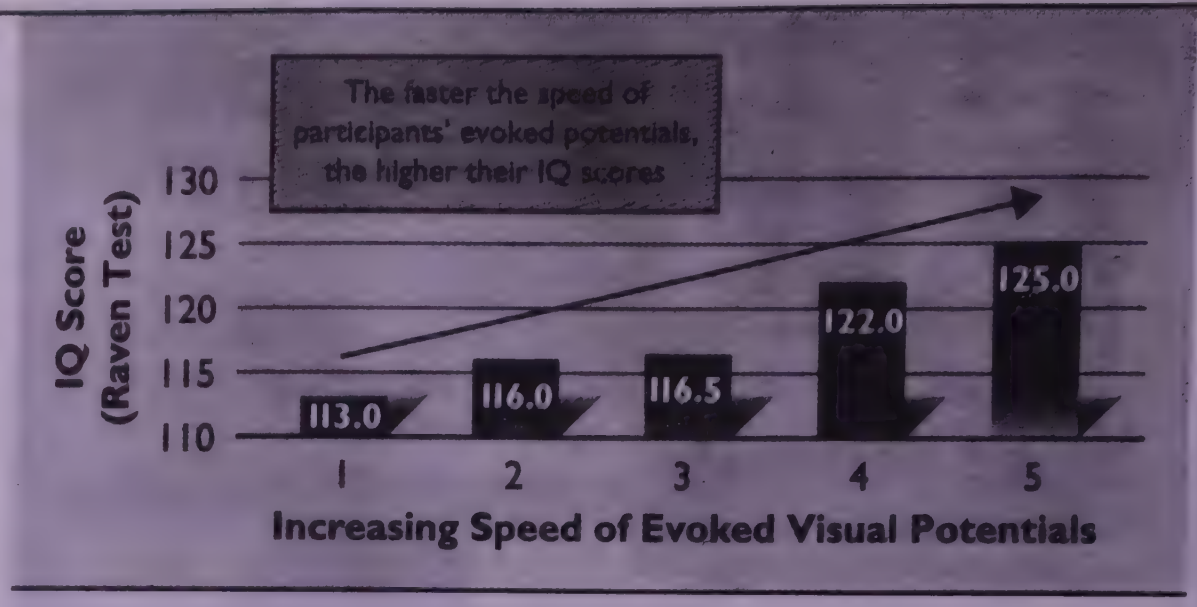
Experiential Intelligence in Operation

When he combined existing technology used in making playing cards, pressing wine, and minting coins to invent the printing press with moveable type, Gutenberg was showing what Sternberg would term *experiential intelligence.*

FIGURE 11.3

The Physiological Basis of Intelligence

The faster their nerve impulses in response to visual stimuli, the higher research participants scored on one test of intelligence. These findings, and many others, suggest that intelligence may rest in part on the efficiency with which individuals' brains process information.
(*Source*: Based on data from Reed & Jensen, 1993.)



presented with a visual stimulus. The average latency, or delay, with which these potentials followed presentation of the visual stimuli was obtained for each volunteer; then the latency was divided by the length of the volunteer's head to obtain a measure of the speed with which nerve impulses were conducted in the visual system. These data were then correlated with the volunteers' scores on one written test of intelligence, the Raven Progressive Matrices, which we'll consider in a later section. As shown in Figure 11.3, results were revealing: The higher this measure of neural speed, the higher was the participant's measured intelligence.

Additional research has examined metabolic activity in the brain during cognitive tasks (e.g., Haier et al., in press). Presumably, if intelligence is related to efficient brain functioning, then the more intelligent people are, the less energy their brains should expend while working on various tasks. This prediction has been confirmed: The brains of persons scoring highest on written measures of intellectual ability *do* expend less energy when these individuals perform complex cognitive tasks. The data in these studies has been gathered using the PET technique of brain imaging described in chapter 2.

Finally, and perhaps most surprising of all, it has been found that there is a link between brain structure and intelligence (Andreasen et al., 1993). Specifically, scores on standard measures of intelligence such as the *Wechsler Adult Intelligence Scale* (to be discussed shortly) are related to the size of certain portions of the brain, including the left and right temporal lobe and the left and right hippocampus (Andreasen et al., 1993). Moreover, this is true even when individuals' overall physical size is statistically controlled and so cannot play a role in these findings.

In sum, it appears that the improved methods now available for studying the brain and nervous system are beginning to establish the kind of links between intelligence and physical structures that psychologists have long suspected to exist. Such research is very recent, and there is not yet enough of it to warrant firm conclusions. Still, it does appear that we are on the verge of establishing much firmer links between intelligence—a crucial aspect of mind—and body than has ever been true before.

KEY POINTS

- While psychologists generally agree that intelligence involves the ability to think abstractly and to learn from experience, there has been considerable disagreement about whether intelligence is unitary or multifaceted in nature.
- Today most psychologists believe that intelligence probably involves both a general capacity to solve many types of problems and several specific abilities.
- In recent years many researchers have adopted an information-processing approach to intelligence.
- One theory that adopts this perspective is Sternberg's triarchic theory of intelligence.
- Additional research indicates that persons scoring high on intelligence tests show faster rates of neural conduction and greater metabolic efficiency in their brains than persons scoring lower on such tests.

Measuring Human Intelligence

In 1904, when psychology was just emerging as an independent field, members of the Paris school board approached Alfred Binet with an interesting request: Could he develop an objective method for identifying children who were mentally retarded, so they could be removed from the regular classroom and given special education? Binet was already at work on related topics, so he agreed, enlisting the aid of his colleague, Theodore Simon.

In designing this test Binet and Simon were guided by the belief that the items used should be ones children could answer without special training or study. They felt that this was important because the test should measure the ability to handle intellectual tasks—*not* specific knowledge acquired in school. Therefore, Binet and Simon decided to use items of two basic types: ones so new or unusual that none of the children would have prior exposure to them, and ones so familiar that almost all youngsters would have encountered them in the past. For example, children were asked to perform the following tasks:

Follow simple commands or imitate simple gestures.

Name objects shown in pictures.

Repeat a sentence of fifteen words.

Tell how two common objects are different.

Complete sentences begun by the examiner.

The first version of Binet and Simon's test was published in 1905 and contained thirty items. Much to the two authors' pleasure, it was quite effective: With its aid, schools could readily identify children in need of special assistance. Encouraged by this success, Binet and Simon broadened the scope of their test to measure variations in intelligence among children of normal intelligence. This revised version, published in 1908, grouped items by age, with six items at each level between three and thirteen years. Items were placed at a particular age level if about 75 percent of children at that age could pass them correctly.

Binet's tests were soon revised and adapted for use in the United States by Lewis Terman, a psychologist at Stanford University. The **Stanford-Binet test**, as it came to be known, gained rapid acceptance and was soon put to use in many settings. Over the years it has been revised several times; see Figure 11.4 (on page 422) for a description of a recent version, published in 1986. One of the features of the Stanford-Binet that contributed to its popularity was that it yielded a single score assumed to reflect an individual's level of intelligence—the now famous *IQ*.

IQ: Its Meaning Then and Now Originally, the letters **IQ** stood for *intelligence quotient*, and a "quotient" is precisely what such scores represent. To obtain an IQ, an examiner divides a student's mental age by his or her chronological age, then multiplies by 100. For this computation, mental age is based on the number of items a person passes correctly on the test. Test takers are awarded two months for each correct item. If an individual's mental and chronological ages are equal, an IQ of 100 is obtained. Numbers above 100 indicate that a person's intellectual age is greater than her or his chronological age; in other words, the individual is more intelligent than typical students of this age. In contrast, numbers below 100 indicate that the individual is less intelligent than her or his peers.

Perhaps you can already see one obvious problem with this type of IQ score: At some point, mental growth levels off or stops, while chronological age continues to grow. As a result, IQ scores begin to decline after the early teen years! Partly because of this problem, IQ scores now have a different

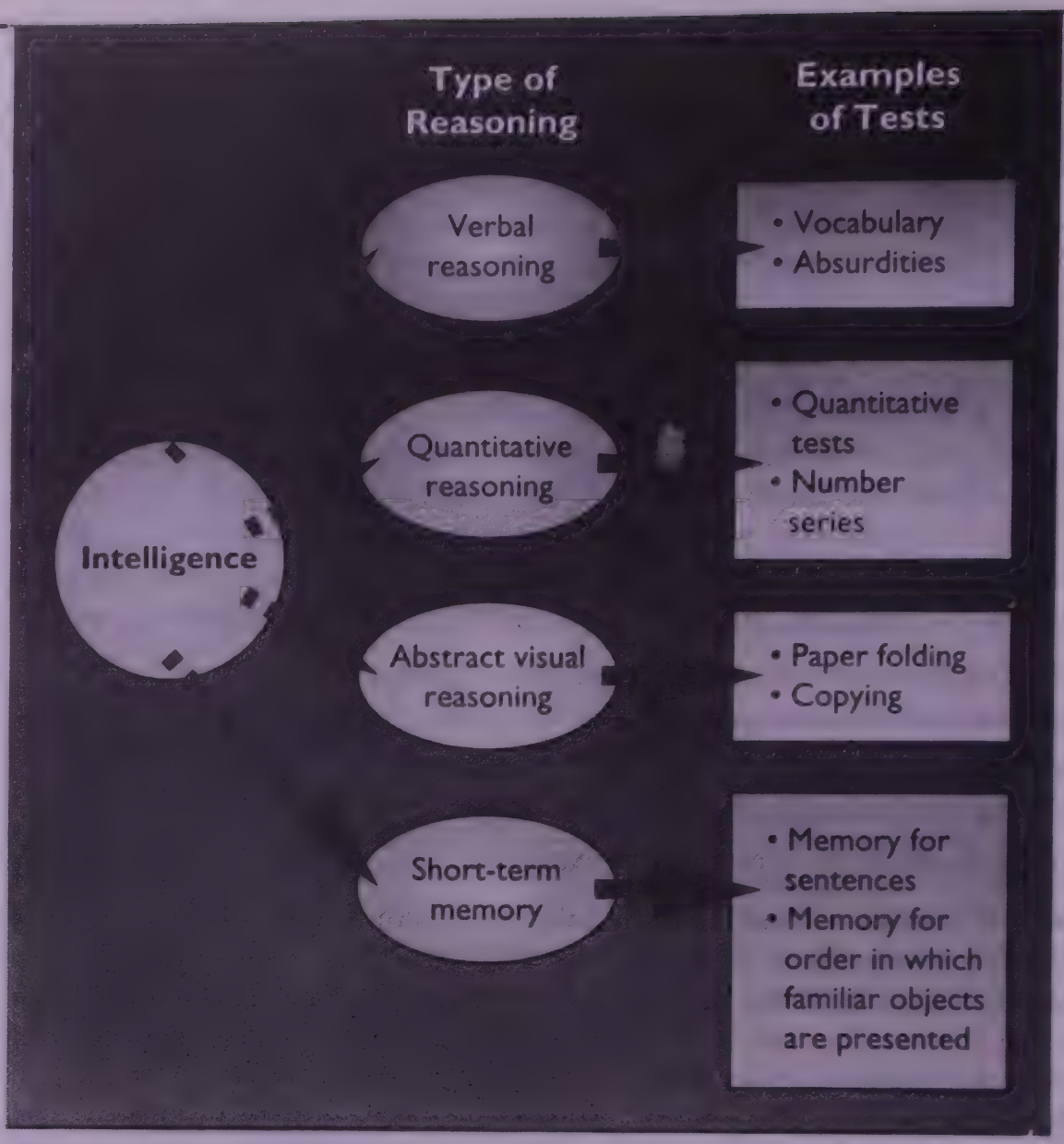
Stanford-Binet Test: *A popular test for measuring individual intelligence.*

IQ: *A numerical value that reflects the extent to which an individual's score on an intelligence test departs from the average for other people of the same age.*

FIGURE 11.4

The Stanford-Binet Test

A recent version of the Stanford-Binet test measures intelligence with a composite score made up of four scores for broad types of mental activity: verbal reasoning, quantitative reasoning, abstract visual reasoning, and short-term memory. Each of the scores is obtained through a series of subtests that measure specific mental abilities.



meaning. They simply reflect an individual's performance on an intellectual test relative to that of persons the same age.

THE WECHSLER SCALES As noted above, the tests developed by Binet and later adapted by Terman and others remained popular for many years. They do, however, suffer from one major drawback: All are mainly verbal in content. As a result, they pay little attention to the fact that intelligence can be revealed in nonverbal activities as well. For example, an architect who visualizes a majestic design for a new building is obviously demonstrating intelligence. Yet no means of assessing such abilities was included in early versions of the Stanford-Binet test.

To overcome this and other problems, David Wechsler devised a set of tests for both children and adults that include nonverbal, or *performance*, items as well as verbal ones, and that yield separate scores for these two components of intelligence. The Wechsler tests are perhaps the most frequently used individual intelligence tests today. Table 11.1 presents an overview of the subtests that make up one of the Wechsler scales, the *Wechsler Adult Intelligence Scale–Revised* (WAIS–R for short).

Wechsler believed that differences between scores on the various subtests could be used to diagnose serious mental disorders. Research on this possibility has yielded mixed results, however. Some findings suggest that a Verbal IQ significantly higher than a Performance IQ can indicate damage to the left cerebral hemisphere, while the opposite pattern can indicate damage to the right

Test	Description
Verbal Tests	
Information	Examinees are asked to answer general information questions, increasing in difficulty.
Digit span	Examinees are asked to repeat series of digits read out loud by the examiner.
Vocabulary	Examinees are asked to define thirty-five words.
Arithmetic	Examinees are asked to solve arithmetic problems.
Comprehension	Examinees are asked to answer questions requiring detailed answers; answers indicate their comprehension of the questions.
Similarities	Examinees indicate in what way two items are alike.
Performance Tests	
Picture completion	Examinees indicate what part of each picture is missing.
Picture arrangement	Examinees arrange pictures to make a sensible story.
Block design	Examinees attempt to duplicate designs made with red and white blocks.
Object assembly	Examinees attempt to solve picture puzzles.
Digit symbol	Examinees fill in small boxes with coded symbols corresponding to a number above each box.

Table 11.1

Subtests of the Wechsler Adult Intelligence Scale

This widely used test of adult intelligence includes the subtests described here.

hemisphere (Aiken, 1991). But this is not always the case, and other evidence is usually required before conclusions can be reached about possible brain damage. Other findings indicate that patterns of scores on the Wechsler tests may be linked to various psychological disorders. For example, some research has found that chronic schizophrenics have higher Verbal IQs than Performance IQs, while persons suffering from a disorder known as the *antisocial personality disorder*—a disorder marked by lack of conscience and by impulsive and often violent behavior (see chapter 14)—have higher Performance than Verbal IQs (Kunce, Ryan, & Eckelman, 1976). Once again, though, not all studies have confirmed such findings, so they must be interpreted with caution.

A Wechsler test for children, the *Wechsler Intelligence Scale for Children* (WISC), has also been developed. Here, too, efforts have been made to determine whether differences in scores on the various subtests indicate various kinds of disorders. Some of the results obtained in this research are intriguing. For example, echoing the findings with respect to the antisocial personality disorder mentioned above, it has been found that Performance IQ almost always exceeds Verbal IQ in youngsters classified as *delinquent* (Hubble & Groff, 1982).

Patterns of scores on the subtests of the WISC are also sometimes used to identify children suffering from various *learning disabilities*. Some findings indicate that children who score high on certain subtests, such as Picture Completion and Object Assembly, but lower on others, including Arithmetic, Information, and Vocabulary, are more likely to be suffering from learning disabilities than children with other patterns of scores (Aiken, 1991). Again, however, not all findings point to such conclusions, so the value of the WISC for this kind of diagnosis remains somewhat uncertain.

The WISC–R

Developed by David Wechsler, the WISC–R (a revised form of the WISC) is one of the most widely used intelligence tests for children.

GROUP TESTS OF INTELLIGENCE Both the Stanford-Binet and the Wechsler scales are *individual* tests of intelligence: They are designed for use with one person at a time. Obviously, it would be much more efficient if *group* tests could be administered to large numbers of people at once. The need for such tests was driven home at the start of World War I, when the armed forces in the United States suddenly faced the task of screening several million recruits. In response to this challenge, psychologists such as Arthur Otis developed two tests: *Army Alpha* for persons who could read, and *Army Beta* for persons who could not read or who did not speak English. These early group tests proved highly useful. For example, they were used to select candidates for officer training school.

KEY POINTS

- The first individual test of intelligence was devised by Binet and Simon. This test yielded an IQ score, obtained by dividing children's mental age by their chronological age. Revised repeatedly over the years, this test continues in widespread use as the Stanford-Binet test.
- Because intelligence can be demonstrated nonverbally as well as verbally, several widely used tests of intelligence, especially the Wechsler scales, obtain both a performance and a verbal IQ.
- Group tests of intelligence are highly efficient, but serious questions have been raised about their use with minority groups.

In the succeeding decades many other group tests of intelligence were developed. Among the more popular of these are the *Otis tests*, such as the Otis-Lennon School Ability Test (Otis & Lennon, 1967); the *Henmon-Nelson Tests* (Nelson, Lamke & French, 1973); and the *Cognitive Abilities Test* (CAT) (Thorndike & Hagen, 1982). All are available in versions that can be administered to large numbers of persons. The advantages offered by such tests soon made them very popular, and they were put to routine use in many school systems during the 1940s and 1950s. As you probably know, in the 1960s this practice was called into question and became the focus of harsh criticism. There were many reasons for this controversy, including the suggestion that such tests were unfair in several respects to children from disadvantaged backgrounds—especially youngsters from certain minority groups. We'll return to these objections below. Now, however, let's consider two other issues relating to these of these—or any other—psychological tests: *reliability* and *validity*.

RELIABILITY AND VALIDITY: Basic Requirements for All Psychological Tests

Suppose that in preparation for a summer at the beach, you decide to go on a diet in order to lose 10 pounds. Your current weight is 135, and for two weeks you skip desserts and engage in vigorous exercise. Then you step onto your bathroom scale to see how much progress you've made. To your surprise, the needle reads 139; you've actually *gained* 4 pounds! How can this be? Perhaps you made a mistake. So you step back on the scale. Now it reads 134. You get off and step onto it again; now it reads 136. At this point you realize the truth: Your scale (thank goodness!) is *unreliable*—the numbers it shows change even though your weight, obviously, can't change from one second to the next.

This is a simple illustration of a very basic point. In order to be of any use, measuring devices must have high **reliability**: They must yield the same result each time they are applied to the same quantity. If they don't, they are essentially useless. The same principle applies to psychological tests, whether they are designed to measure intelligence or to gauge any other characteristic. But how do we know whether and to what extent a test is reliable? In fact, several different methods exist for assessing a test's reliability.

Reliability: *The extent to which any measuring device yields the same results when applied more than once to the same quantity.*

INTERNAL CONSISTENCY: DO THE ITEMS ON A TEST MEASURE THE SAME THING? If we wish to develop a test that measures a single psychological characteristic such as intelligence, then it is important to establish that all the items actually measure this characteristic—that the test has what psycholo-

gists call *internal consistency*. One measure of the internal consistency of a test is known as **split-half reliability**. Checking for split-half reliability involves dividing the test into two equivalent parts, such as the first and second halves or odd- and even-numbered items, and then comparing people's scores on each. If the test really measures intelligence, then the correlation between the scores on each half should be positive and high. If it is not, then some of the items may be measuring different things, and the test may be unreliable in one important sense. There are several statistical formulas for measuring internal consistency. The most widely used formula, *coefficient alpha*, simultaneously considers all of the possible ways of splitting into halves the items on a test. Since this is done on computers, the process is very efficient, and coefficient alpha has become one standard measure of tests' internal consistency.

Consistency across Time: Test-Retest Reliability A test that yields very different scores when taken by the same persons at different times is of little value if the characteristics it supposedly measures are ones that are stable over time, such as intelligence. Thus, another type of reliability, **test-retest reliability**, is also important. Test evaluators can measure this by giving the test to the same group of persons on more than one occasion and comparing the scores. The more similar these are, the higher the test-retest reliability.

One obvious problem with the test-retest method is that people's scores on the retest may increase simply because they have taken the test again—because of *practice effects*. To reduce this problem, psychologists often use *alternate forms* of the same test—two different forms that cover the same material at the same level of difficulty. Figure 11.5 (on page 426) provides an overview of both split-half reliability and test-retest reliability assessment procedures.

Validity: Do Tests Measure What They Claim to Measure? On a recent visit to one of our local malls, I noticed a new machine outside one of the stores. A sign on the front of the machine read "Test Your Sex Appeal!" I was fascinated, so I read further. According to the sign, after inserting a quarter and pushing some buttons, users would receive a score indicating their appeal to members of the opposite sex. Do you think this machine was really capable of measuring sex appeal? The answer is obvious: no! In all probability, it measured nothing whatsoever—except, perhaps, willingness to believe silly claims. Psychologists say that such machines—and any other measuring device that claims to measure something it does not—are low in **validity**—the ability to measure what they are supposed to measure.

The same principle also applies to psychological tests: They are useful only to the extent that they really measure the characteristics they claim to assess. Thus, an intelligence test is useful only to the extent that it really measures intelligence. How can we determine whether a test is valid? Through several different methods. One of these is to gauge **content validity**: the extent to which the items on a test sample the behaviors we can reasonably assume are related to the characteristic in question. For example, if an intelligence test consisted of measurements of the length of people's earlobes or the sharpness of their teeth, we could probably assume that it was low in content validity: These measurements do not seem to be related to what we mean by the term *intelligence*. If, instead, the test measured the breadth of a person's vocabulary or his or her ability to solve various kinds of puzzles, we would have more faith in the content validity of the items: They do seem to be related to various aspects of intelligence.

Another type of validity is known as **criterion-related validity** and is based on the following assumption: If a test actually measures what it claims to measure, then persons attaining different scores on it should also differ in terms of their behavior. Specifically, they should differ in terms of some *crite-*

Split-Half Reliability: *The extent to which an individual attains equivalent scores on two halves of a psychological test.*

Test-Retest Reliability: *The extent to which a psychological test yields similar scores when taken by the same person on different occasions.*

Validity: *The extent to which tests actually measure what they claim to measure.*

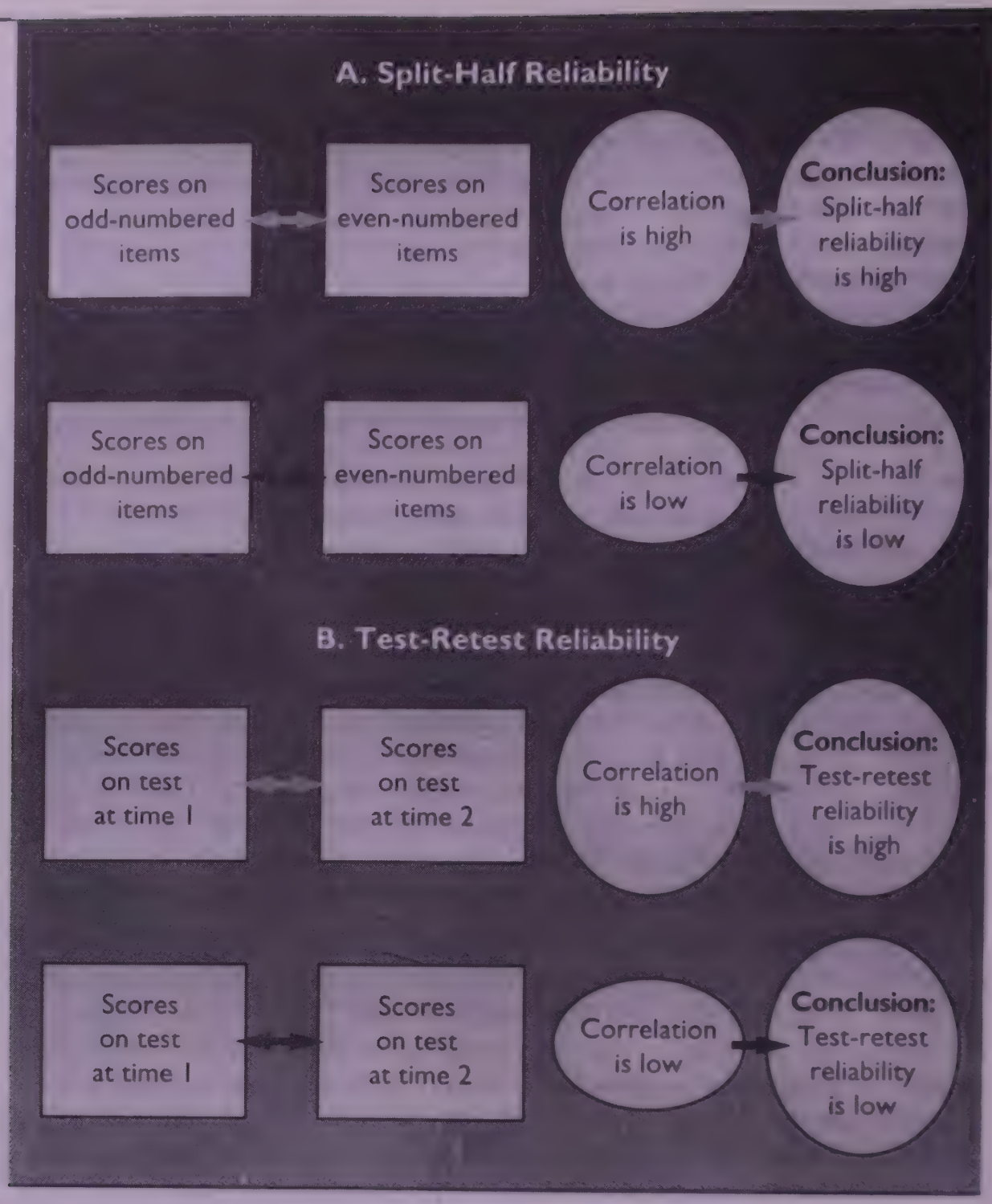
Content Validity: *The extent to which the items on a test sample the skills or knowledge needed for achievement in a given field or task.*

Criterion-Related Validity: *A measure of the validity of any psychological test, determined by correlations between scores on the test and some standard of the characteristic the test supposedly assesses.*

FIGURE 11.5

Reliability: A Basic Requirement of Psychological Tests

In order to be useful, psychological tests must be reliable. Two types of reliability are illustrated here: (A) *split-half reliability* (a type of *internal consistency)* and (B) *test-retest reliability*.



rion or standard relating to the trait being measured. For example, we might expect that scores on an intelligence test would be related to the criterion of achievement in school, or to success in various occupations.

Two kinds of criterion-related validity that are often measured by psychologists are **predictive validity** and **concurrent validity**. To measure predictive validity, psychologists use scores on a test to predict *later* performance relative to some criterion. For example, scores on an intelligence test taken now are used to predict success in some kind of training program. To measure concurrent validity, psychologists relate scores on a test taken now to *present* performance on some criterion. Thus, they might relate scores on the test to students' current performance in school.

Predictive Validity: *The relationship between scores on a test and later performance relative to a criterion.*

Concurrent Validity: *The relationship between test scores and current performance relative to some criterion.*

Construct Validity: *The extent to which a test measures a variable or concept described by a psychological theory.*

A third type of validity, **construct validity,** is a bit more complex. This type of validity has to do with the extent to which a test measures a psychological concept or variable that can't be assessed directly, but plays an important role in psychological theory. Such validity can be established in several ways. For example, we can find out whether results on our test are consistent with results obtained on other obvious or well-established measures of the same *construct*—the same variable or concept. Suppose we develop a test that we believe measures the tendency to take risks. If persons who score high on

our test also have more traffic accidents and are more likely to belong to sky-diving or mountain-climbing clubs than persons who score low on the test, we have some *convergent evidence* that the test really does measure something like risk-taking tendencies. Please see the **Key Concept** feature (on page 428) for an overview of different types of validity.

In sum, any psychological test is useful only to the extent that it is both reliable and valid—to the extent that the test yields consistent scores and that independent evidence confirms that it really does measure what it purports to measure. How do intelligence tests stack up in this respect? In terms of reliability, the answer is: quite well. Widely used tests of intelligence do yield consistent scores and do possess internal consistency. The question of validity, however, is much more controversial, especially where group tests of intelligence are concerned. The issue of validity leads us back to an issue raised earlier: Are intelligence tests suitable for use with persons from various minority groups?

Intelligence Testing and Public Policy: Are Intelligence Tests Fair?

Objections to the widespread use of group tests of intelligence have touched on many different points. Perhaps the most important, though, is the possibility that such tests are biased against certain groups. The basis for such concerns is obvious: In the United States and elsewhere, people belonging to several ethnic and racial minorities score lower on group tests of intelligence than other persons (Weinberg, 1989). For example, African Americans, Native Americans, and persons of Hispanic descent score lower than whites of European ancestry (Aiken, 1991; Cohen et al., 1988). Further, it appears that these tests may be less *valid* when used with such groups; for example, these groups' scores on the tests are less successful in predicting their future performance in school (Aiken, 1991). What factors are responsible for such differences? Many critics of group intelligence tests contend that the differences stem mainly from strong **cultural bias** built into these tests. In other words, because the tests were developed by and for persons belonging to a particular culture, individuals from other backgrounds may be at a disadvantage when taking them.

Are such concerns valid? Careful examination of the items used on intelligence tests suggests that to a degree they are. Many items assume that all children have had the opportunity to acquire certain kinds of information. Unfortunately, this is not always true for children from disadvantaged or minority backgrounds, who may never have had the chance to acquire the knowledge being tested. Thus, they cannot answer correctly, no matter how high their intelligence.

As Helms (1992) argues forcefully, however, this is only part of the problem. She notes that widely used intelligence tests also suffer from other forms of cultural bias that may be somewhat more subtle but are just as damaging for minority children. Such tests, Helms contends, incorporate unstated values that derive primarily from a *Eurocentric perspective*—an implicit acceptance of European values as the standards against which everything is judged (Helms, 1989). For example, Helms contends, European cultures accept a view she terms *dualism*—the idea that answers are either right or wrong, and that only logical thinking is to be valued. Children from European-descended cultural backgrounds accept this value, so when they take intelligence tests, they look for the one correct answer on each item. According to Helms, children from other backgrounds—for example, African-American children—may accept this value to a lesser degree, or may even accept other values that can interfere with their test performance. For instance, they may

Cultural Bias: *The tendency of items on a test of intelligence to require specific cultural experience or knowledge.*

KEY CONCEPT

Major Types of Test Validity

Content Validity

The extent to which items on a test are related to the characteristics or behaviors we wish to measure.

For example, the flight simulator shown here tests many behaviors that pilots must demonstrate when actually flying a plane. Because of this close linkage between test components and real flight skills, the simulator may be said to possess high content validity.

Criterion-Related Validity

The extent to which test scores are related to some accepted measure of the characteristic or behavior we wish to measure.

For example, scores on some tests of *academic aptitude* (the ability to learn the kinds of skills taught in school) are related to grades and, ultimately, to graduation. The stronger this relationship, the greater is the criterion-related validity of such tests (one of which is the well-known Scholastic Aptitude Test, or SAT).

Construct Validity

The extent to which a psychological test measures a psychological variable that can't be assessed directly and has no simple or clear-cut criteria.

For example, scores on a test of the psychological variable *stress tolerance* may be related to several other possible indicators of tolerance for stress. Persons who score high on this test may be more likely to work in high-stress occupations such as emergency room medicine than are persons who score low. And persons who score low may be more likely to experience stress-related illnesses such as heart attacks.

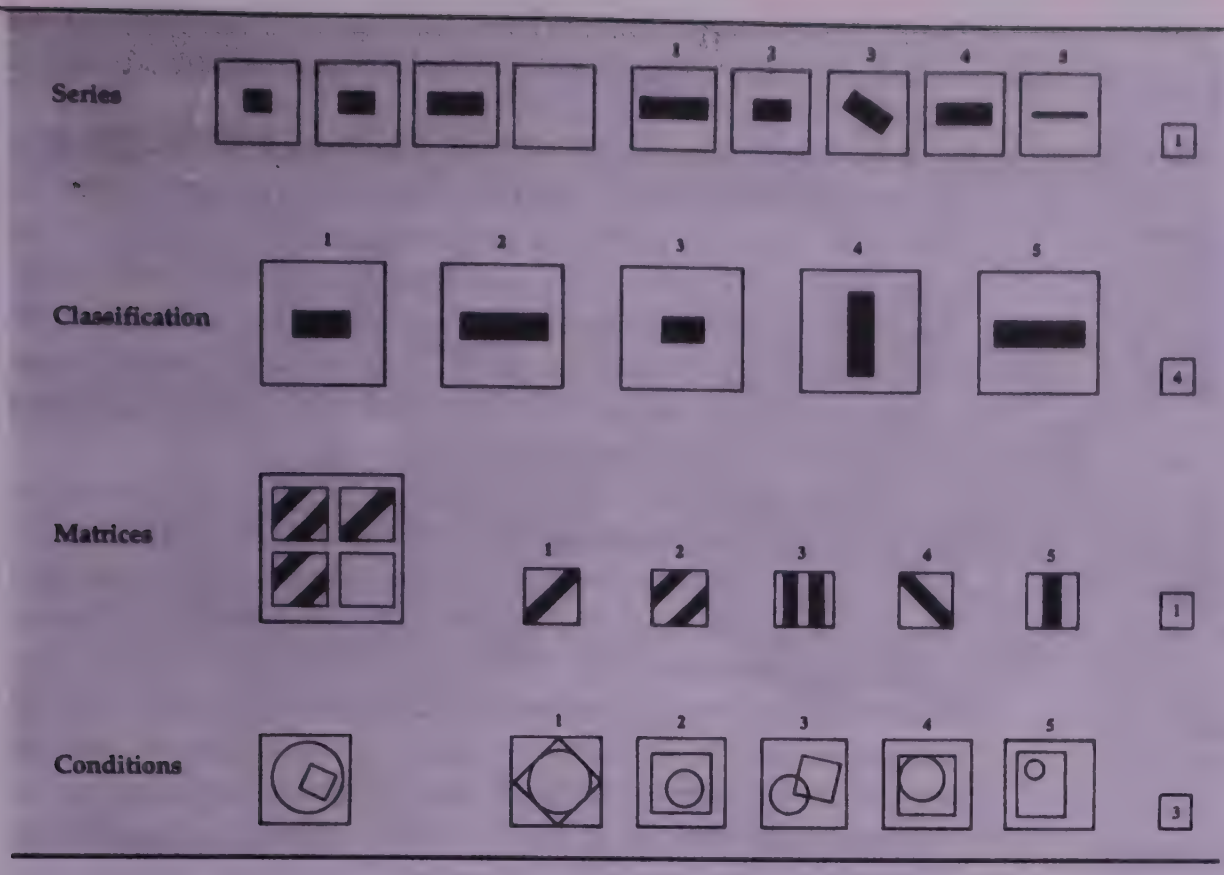


FIGURE 11.6

Sample Items from One Culture-Fair Test of Intelligence

The *Culture-Fair Intelligence Test* includes items designed to be unaffected by specific cultural knowledge or experience. The items shown here are similar to those in one such test. Unfortunately, it has proved impossible to devise a test that is totally independent of culture-related factors.

(*Source:* Based on items from the Culture-Fair Intelligence Test, Institute for Personality and Ability Testing, Inc. Copyright © 1949, 1960, by the Institute for Personality and Ability Testing, Inc. All rights reserved. Reproduced by permission.)

not assume that answers are right or wrong; they may spend time reasoning about the extent to which each possible answer is accurate. In other words, Helms suggests, subtle cultural factors may influence the way in which children approach intelligence tests—the tactics they use in taking the tests—and these, in turn, can influence their scores.

In an effort to eliminate cultural bias from intelligence tests, some psychologists have attempted to design *culture-fair* tests. Such tests attempt to include only items to which all groups, regardless of ethnic or racial background, have been exposed. Because many minority children are exposed to languages other than standard English, these tests tend to be nonverbal in nature. I referred to one of these—the **Raven Progressive Matrices** (Raven, 1977)—in my earlier discussion of the biological bases of intelligence. This test consists of sixty matrices of varying difficulty, each containing a logical pattern or design with a missing part. Individuals select the item that completes the pattern from several different choices. Evidence indicates that the Raven test is a valid measure of general intelligence (Paul, 1985), but it is not clear that it or any other supposedly culture-fair test fully addresses the sources of cultural bias described by Helms (1992) and others. Items from another such test, the *Culture-Fair Intelligence Test*, are shown in Figure 11.6. As you can see, it requires test takers to work with abstract figures or with relations between various objects. Presumably, such items are less subject to cultural bias than verbal items; but, again, this has not been clearly established.

Another test that has gained increasing popularity recently is the *Kaufman Assessment Battery for Children*, or K-ABC for short (Kaufman, 1983). This individually administered test is designed specifically to measure information-processing capacity. In other words, it focuses on effectiveness in handling new information and minimizes the role of language and previously acquired information or skills. It includes tasks that require *sequential processing*, such as repeating a series of digits in the same order in which they are presented, as well as ones that require *simultaneous processing*, or integrating many stimuli at once. An example of simultaneous processing is remembering the placement of various pictures on a page following a brief exposure to

Raven Progressive Matrices: *One popular "culture-fair" test of intelligence.*

Key Points

- In order to be useful, any psychological test must have high reliability: it must yield very similar scores when applied more than once to the same quantity. Reliability can be measured in terms of internal consistency—the extent to which all items on the test measure the same characteristic; and through test-retest reliability—the extent to which scores on a test are stable over time.
- In order to be useful, psychological tests must also be high in validity—the capacity to measure what they claim to measure.
- Types of validity include content validity, criterion-related validity, and construct validity.
- In the United States and elsewhere, members of several minority groups score lower on standard intelligence tests than do whites of European descent. This appears to be due at least in part to the cultural bias of these tests.
- Efforts to construct culture-fair tests of intelligence have been only partly successful.

them. Results with this test have been promising. Differences between African Americans, Hispanics, and whites are much smaller than those on other intelligence tests. However, critics note that these smaller differences in test scores come at the expense of reduced predictive validity: scores on the K-ABC are less successful in predicting success in school or other contexts than scores on other intelligence tests. Still, this test's focus on information processing is consistent with psychology's emphasis on the information-processing perspective and may represent one useful approach to solving a difficult and complex problem.

Perhaps, ultimately, the solution to the problem of designing completely culture-fair tests of intelligence will involve the development of reliable *physiological measures*—ones that assess the speed and efficiency with which human brains process information (e.g., Matarazzo, 1992). Presumably, basic aspects of brain functioning are much the same for all human beings, so it may be possible to eliminate, or at least reduce, the impact of cultural bias through such measures. I should add that at present this is merely a possibility: Research relating brain structure and function to intelligence is too new and too fragmentary to permit any firm conclusions. But at least this research does offer one promising avenue for meeting a need on which all psychologists agree: the need for tests of intelligence that do not place *any* group of persons at an unfair disadvantage.

What are the practical uses to which existing tests of intelligence are put? Please see the **Point of It All** section below for information on this issue.

The Point of It All

Individual Tests of Intelligence: Their Practical Uses

Individual tests of intelligence are costly: They must be administered one-on-one by a psychologist or other trained professional. Why, then, do they continue to be widely used? The answer is that these tests have several practical uses and provide benefits that offset their obvious costs. The most important of these uses is identification of children at the extremes with respect to intelligence: those who suffer from some degree of *mental retardation* and those who are *intellectually gifted*.

Mental retardation refers to considerably below-average intellectual functioning combined with varying degrees of difficulty in meeting the demands of everyday life (Aiken, 1991; Wielkiewicz & Calvert, 1989). As shown in Figure 11.7, persons with mental retardation are typically described according to four broad categories of retardation: mild, moderate, severe, and profound. Individuals' level of retardation is determined by at least two factors: their test scores *and* their success in carrying out activities of daily living expected of persons their age.

What causes mental retardation? In some cases it can be traced to genetic abnormalities such as **Down Syndrome**, which is caused by the presence of an extra chromosome; persons with Down syndrome usually have IQs below 50.

Mental Retardation: *Intellectual functioning that is considerably below average.*

Down Syndrome: *A disorder caused by an extra chromosome and characterized by varying degrees of retardation and physical disorders.*

FIGURE 11.7

Degrees of Mental Retardation

Degree of mental retardation is often identified according to IQ scores on standard tests of intelligence. In general, an IQ score that falls below 70 suggests some level of retardation. IQ scores are not the only consideration, however; the individual's capacity to function adequately in everyday life is also important.

CLASSIFICATION	STANFORD-BINET IQ SCORE	WECHSLER IQ SCORE	PERCENTAGE OF THE MENTALLY RETARDED	EDUCATIONAL LEVEL POSSIBLE
Mild	52–68	55–69	90	Sixth grade
Moderate	36–51	40–54	6	Second to fourth grade
Severe	20–35	25–39	3	Limited speech
Profound	Below 20	Below 25	1	Unresponsive to training

Mental retardation can also result from environmental factors, such as inadequate nutrition or use of drugs or alcohol by mothers during pregnancy, infections, toxic agents, and traumas resulting from a lack of oxygen during birth. Most cases of mental retardation, however, cannot readily be traced to specific genetic or environmental causes. Persons in this group are usually mildly retarded, having IQs between 50 and 70.

Intelligence tests have also been used to identify the *intellectually gifted*—persons whose intelligence is far above average (Goleman, 1980; Terman, 1954). The most comprehensive study of persons with high IQs was begun by Lewis Terman in 1925. He followed the lives of 1,500 children with IQs of 130 or above to determine the relationship between high intelligence on the one hand, and occupational success and social adjustment on the other. As a group, the gifted children in Terman's study were tremendously successful: They earned more academic degrees, attained higher occupational status and salaries, experienced better personal and social adjustment, and were healthier than the average adult. These results refuted the commonly held belief that intellectually gifted persons are social or emotional weaklings—nerds who miss out on all the fun of life.

While many programs currently exist for children identified as mentally retarded, there is growing concern that in the United States and elsewhere, intellectually gifted children are being largely ignored (Resnick, 1993). In part, this situation is due to a rejection of the concept of *ability grouping*—dividing students into groups according to intellectual ability, and designing different educational programs for each group. Ability grouping was common practice in the past; in fact, it was an important part of *my* educational experience. In the sixth grade, everyone in my school took a test that I now realize was a standard group test of intelligence. Because I scored high, I was placed in a

DOWN SYNDROME: A GENETIC CAUSE OF MENTAL RETARDATION

One cause of mental retardation is Down syndrome, a genetic defect that occurs when the cells in the body have an extra copy of chromosome number 21.

special class that covered the seventh, eighth, and ninth grades in two years. Looking back, it was a very stimulating experience and probably played a large role in my choice of an academic career. Also, it certainly boosted my self-esteem to hear from teachers, over and over again, that I was part of a class that was "the cream of the crop" and that they expected my classmates and me to go on to do great things! Partly because minority groups were often underrepresented in such programs, however, accelerated classes no longer exist in many school systems. One result of this change is that many bright children, forced to proceed through programs designed for average learners, quickly become bored and turned off (Resnick, 1993). Growing recognition of these problems—and the potential losses to society they may represent—has led recently to the reestablishment of special programs for gifted children in a few locations. Only time will tell whether this will become a general trend in education. In any case, it does illustrate one of the potential uses to which individual (or group) tests of intelligence can be put.

HUMAN INTELLIGENCE: The Role of Heredity and the Role of Environment

That people differ in intelligence is obvious. Indeed, we rarely need test scores to remind us of this fact. The causes behind these differences, though, are less obvious. Are they largely a matter of heredity—differences in the genetic materials and codes we inherit from our parents? Or are they primarily the result of environmental factors—conditions favorable or unfavorable to intellectual growth? I'm sure you know the answer: Both types of factors are involved. Human intelligence appears to be the product of an extremely complex interplay between genetic factors and environmental conditions (Plomin, 1989; Weinberg, 1989). Let's now review some of the evidence pointing to this conclusion.

HEREDITY AND INTELLIGENCE

Research has shown that the more closely two persons are related, the more similar their IQ scores tend to be. But does this suggest that a person's environment has no effect on intelligence?

EVIDENCE FOR THE INFLUENCE OF HEREDITY

Several lines of research offer support for the view that heredity plays a significant role in human intelligence (see Figure 11.8). First, consider findings with respect to family relationship and measured IQ. If intelligence is indeed determined by heredity, we would expect that the more closely two persons are related, the more similar their IQs will be. This prediction has generally been confirmed (Bouchard & McGue, 1981; Erlenmeyer-Kimling & Jarvik, 1963). For example, the IQs of identical twins raised together correlate almost +0.90, those of brothers and sisters about +0.50, and those of cousins about +0.15. (Remember: higher correlations indicate stronger relationships between variables.)

Additional support for the impact of heredity on intelligence is provided by studies involving adopted children. If intelligence is strongly affected by genetic factors, the IQs of adopted children should resemble those of their

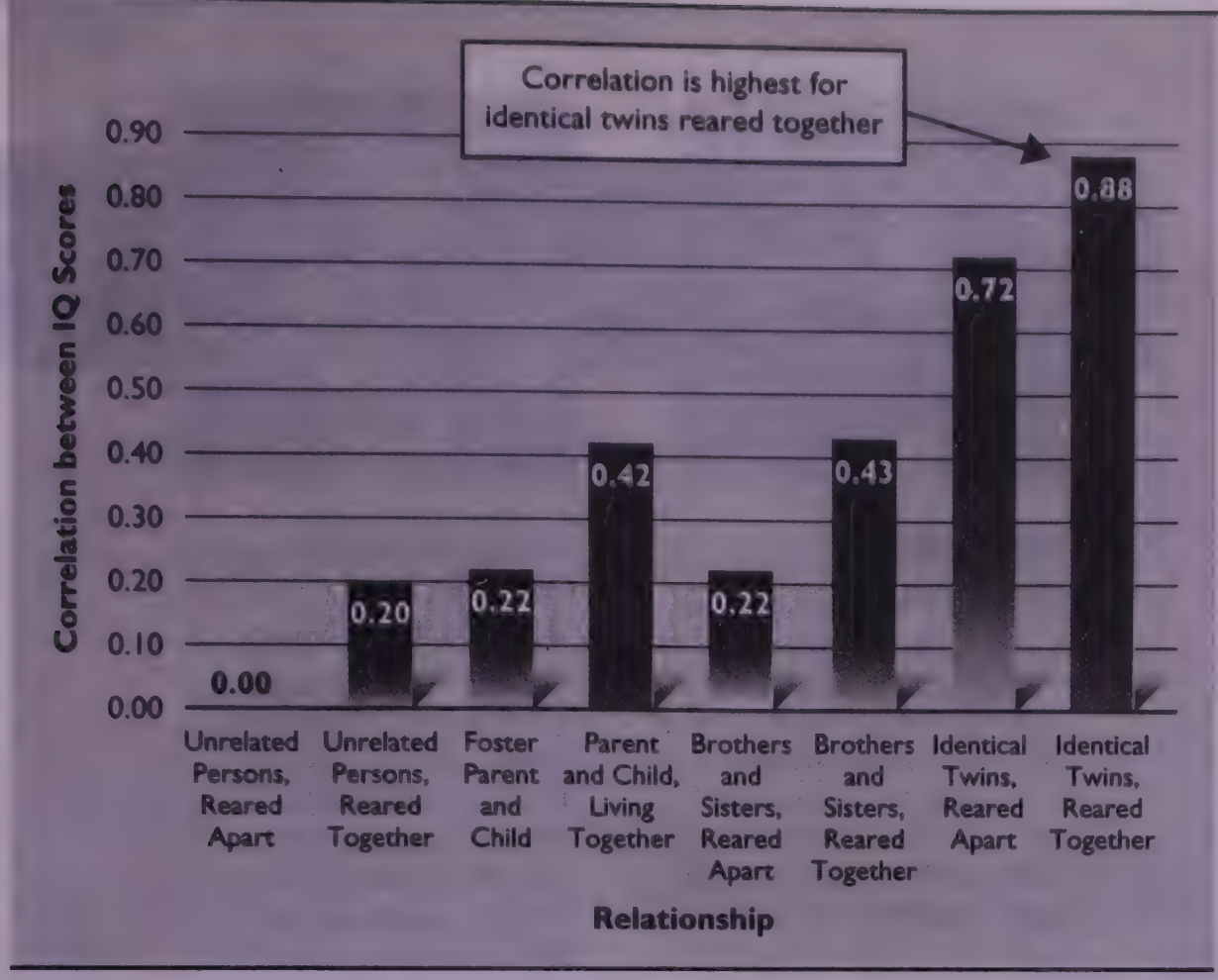


FIGURE 11.8

Correlations between IQ Scores of Persons of Varying Relationships

The closer the biological relationship of two individuals, the more similar their IQ scores—strong support for a genetic component to intelligence.
(*Source:* Based on data from Bouchard & McGue, 1981; and Erlenmeyer-Kimling & Jarvis, 1963.)

biological parents more closely than those of their adoptive parents. In short, the children should be more similar in IQ to the persons from whom they received their genes than to the persons who raised them. This prediction, too, has been confirmed. While the IQs of adopted children correlate about +0.40 to +0.50 with those of the children's biological parents, they correlate only about +0.10 to +0.20 with those of their adoptive parents (Jencks, 1972; Munsinger, 1978). Be aware, though, that not all studies have yielded such results. Further, in some investigations, the IQs of adopted children have been observed to become increasingly similar to those of their adoptive parents over time (Scarr & Weinberg, 1976). These findings indicate that environmental factors, too, play an important role.

Perhaps the most intriguing evidence for the role of genetic factors in intelligence has been provided by Bouchard and his colleagues through a project called the *Minnesota Study of Twins Raised Apart* (Bouchard, 1987; Bouchard et al., 1990). In this research, Bouchard and his colleagues have tracked pairs of identical twins who were separated early in life and were raised in different homes. Since such persons were exposed to different environmental conditions—in some cases, sharply contrasting ones—a high correlation between their IQs would suggest that heredity plays a key role in human intelligence. In fact, this is what has been found. The IQs of identical twins reared apart (in many cases, from the time they were only a few days old) correlate almost as highly as those of identical twins reared together. Moreover, such persons are also amazingly similar in many other characteristics, such as physical appearance, preferences in dress, mannerisms, and even personality. Clearly, such findings point to an important role of heredity in intelligence and in many other aspects of psychological functioning.

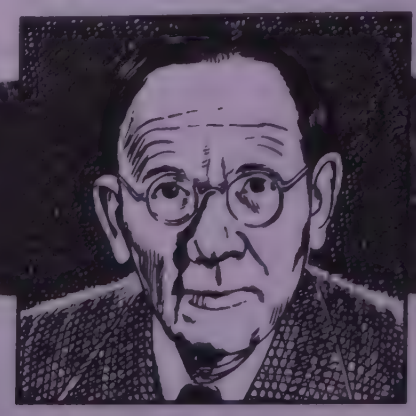
We have already considered other research that can be interpreted as evidence for the role of heredity in intelligence. This is the finding that various measures of the speed of neural conduction or efficiency in brain functioning are associated with scores on intelligence tests (Haier et al., in press; Reed &

IDENTICAL TWINS REARED APART

The IQ scores of identical twins separated at birth and raised in different home environments—such as Oskar Stohr and Jack Yufe, shown here—are highly correlated. This finding provides evidence for the impact of genetic factors on intelligence.

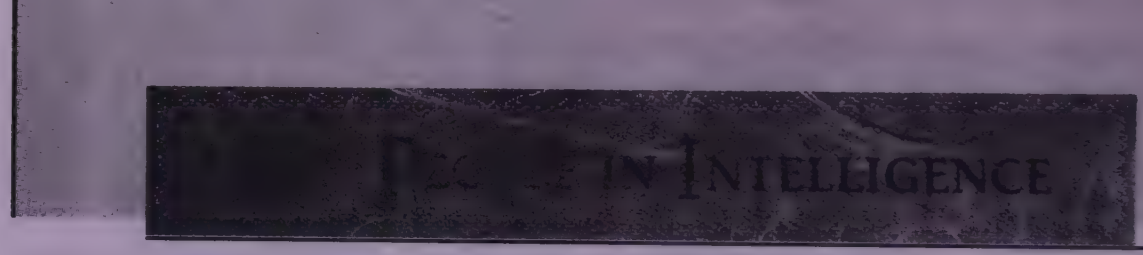
Alfred Binet (1857–1911)

In 1905, Binet developed the first intelligence test, known as the Binet-Simon test. He developed the concept of mental age, and based much of his early work on intelligence on his own daughters.



Lewis Madison Terman (1877–1956)

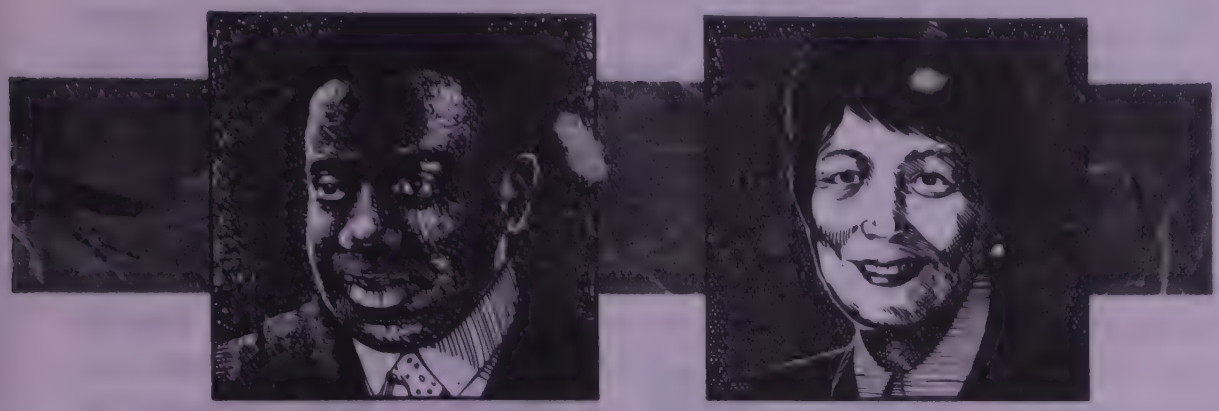
Terman translated and adapted the Binet-Simon intelligence test to create the Stanford-Binet test. Terman's well-known studies of gifted children dispelled many misconceptions about such children.



Jensen, 1993). As I noted when I discussed these findings, one interpretation of them is that intelligent people have efficient brains: They can accomplish the same amount of cognitive work faster and with less physical effort. Since the physical structure of the brain, like that of other parts of our bodies, is strongly determined by genetic factors, it seems possible that intelligence, too, is shaped at least partly by such factors. Needless to add, such suggestions are mainly speculative at present. Additional evidence is needed before we can reach firm conclusions about the relationship between brain activity, the brain's physical structure, and intelligence.

Evidence for the Influence of Environmental Factors

Genetic factors are definitely not the total picture where human intelligence is concerned, however. Other findings point to the conclusion that environmental variables, too, are of great importance. One such finding is that in the late twentieth century, IQ scores have risen substantially around the world at all age levels (Flynn 1987). Since it seems very unlikely that massive shifts in human heredity have occurred during these decades, this rise can be interpreted only as stemming from environmental factors—rising living stan-



Albert Sidney Beckham (1897–1964)

Beckham conducted research into the nature of intelligence and developed reports such as "Minimum Levels of Intelligence for Certain Occupations," which became a guide at state institutions for training people with mental retardation. In the 1920s, he established a psychological laboratory at Howard University, the first of its kind at a black institution of higher learning.

Sandra Scarr

Scarr is a developmental psychologist whose research on the impact of heredity and environment on intelligence is widely known. Her adoption studies have provided strong evidence for the role of environment in racial differences in IQ.

dards, improved diets, and better educational opportunities for millions of human beings.

Second, studies of *environmental deprivation* and of *environmental enrichment* offer support for the important role of environmental factors. With respect to deprivation, it has been found that intelligence can be reduced by the absence of certain forms of environmental stimulation early in life (Gottfried, 1984). In terms of enrichment, removing children from sterile, restricted environments and placing them in more favorable settings seems to enhance their intellectual growth. For example, in one of the first demonstrations of the beneficial impact of an enriched environment on IQ, Skeels (1938, 1966) removed thirteen children, all about two years old, from the impoverished orphanage in which they lived and placed them in the care of a group of retarded women living in an institution. After a few years Skeels noted that the children's IQs had risen dramatically—on average, 29 points. Interestingly, Skeels also obtained IQ measures of children who had remained in the orphanage and found that the average IQ among this group had actually *decreased* by 26 points—presumably as a result of the impoverished environment at the orphanage. Twenty-five years later, the thirteen children who had experienced the enriched environment were all doing well; most had graduated from high school, found a job, and married. In

contrast, those in the original control group either remained institutionalized or were functioning poorly in society.

Third, some special programs designed to enrich the educational experiences of children from disadvantaged backgrounds have been found to produce substantial increases in the IQ scores of participants (Royce, Darlington, & Murray, 1983). Perhaps the most famous (and controversial) of these is *Project Head Start*, a federally funded program in the United States that provides special intellectual and social skills training for young children from disadvantaged environments (Zigler & Berman, 1983). Evaluations of Project Head Start have yielded mixed results; children who participate in Project Head Start do not demonstrate lasting gains in IQ score (Haskins, 1989) but do surpass nonparticipants in other important ways. For example, Head Start graduates are less likely to fail in school or require remedial courses, and are more likely to exhibit positive self-esteem, than nonparticipants (McKey et al., 1985).

Fourth, evidence for the significant impact on intelligence of environmental factors is also provided by the type of kinship studies described earlier. Such studies indicate that for a given degree of kinship, or family relationship, individuals raised in the same environment have more similar IQs than persons raised apart, in different environments. For example, the IQs of brothers and sisters raised together correlate about +0.50, whereas the IQs of those raised apart correlate about +0.45.

A fifth kind of evidence for the influence of environmental factors is provided by research on birth order and intelligence. Several studies report that first-borns tend to have higher IQs than second-borns, who tend to have higher IQs than third-borns, and so on (Zajonc & Markus, 1975). The differences are not large—only a few IQ points at most—but they do seem to be real. Why do such differences exist? One possibility is suggested by **confluence theory**, a theory proposed by Zajonc (1975, 1986). According to confluence theory, each individual's intellectual growth depends to an important degree on the intellectual environment in which he or she develops. A first-born child benefits from the fact that for some period of time, until the birth of another child, he or she lives with two adults who provide a relatively advantaged intellectual environment (Figure 11.9). A second-born child, in contrast, lives with two adults who divide their attention with another child; thus, the average level of his or her intellectual environment is somewhat diluted. Such effects become even stronger for third-borns and continue to grow as the number of children in a family rises.

Regardless of whether Zajonc's interpretation proves accurate, the fact that first-borns tend to have higher IQs than later-borns cannot readily be explained in terms of heredity; the genes contributed by parents should remain fairly constant across the entire birth order. Thus, the impact of environmental factors is suggested once again.

Finally, the role of environmental factors in intelligence is indicated by many studies reporting that the longer students remain in school, the higher their IQ scores tend to be (Ceci, 1991). While this finding could also be interpreted as suggesting that it is the more intelligent people who choose to remain in school, several facts point to the conclusion that staying in school may actually benefit intelligence. For example, it has been found that people who attend school regularly score higher on intelligence tests than persons who attend irregularly, and that those who start school at an older than average age score lower than those who start at an average or younger than average age. In addition, there is some indication that the worldwide increase in IQ scores to which I referred earlier stems at least in part from increased years in school in many countries (Ceci, 1991).

Confluence Theory: A theory suggesting that IQ tends to decrease across the birth order within a family; firstborns tend to have a higher IQ than second-borns, and so on.

I should also note that a wide range of other environmental factors have been found to be related to IQ scores. These include nutrition, family back-

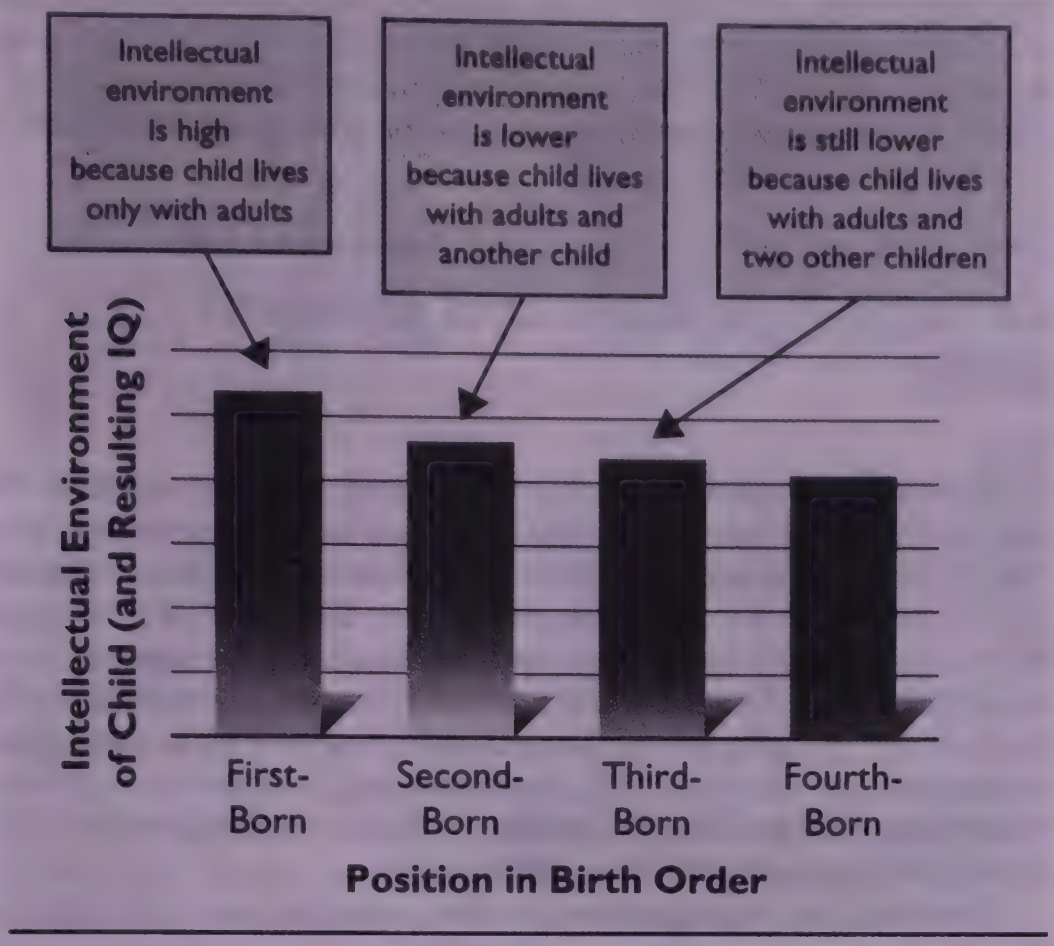


FIGURE 11.9

Birth Order and IQ: Confluence Theory

According to *confluence theory*, the intellectual environment in which children develop becomes less and less favorable as the number of previous children born in the family increases. As a result, the IQ of first-borns is higher than that of second-borns; the IQ of second-borns is higher than that of third-borns, and so on. Research on confluence theory suggests that these differences are quite small but do seem to exist.
(*Source*: Based on suggestions by Zajonc, 1976.)

ground (for example, parents' education and income), and quality of education, to mention just a few (Bouchard & Segal, 1985). The measurable effects of such factors are small, but, again, they appear to be real.

Environment, Heredity, and Intelligence: Summing Up

In sum, there is considerable evidence that *both* environmental and genetic factors play a role in intelligence. This is the view accepted by almost all psychologists, and there is little controversy about it. Greater disagreement continues to exist, however, concerning the *relative* contribution of each of these factors. Do environmental or genetic factors play a stronger role in shaping intelligence? Or are the two kinds of influences of roughly equal importance? To date, efforts to answer this question have failed to yield a clear answer. However, growing evidence from the field of *behavioral genetics* does seem to point to the possibility that genetic factors are quite important—perhaps more important in some respects than environmental ones (Plomin, 1989).

As you can probably guess, many psychologists are made uneasy by the implications of this possibility (Hernstein, 1973; Kamin, 1978). Being concerned with human welfare, psychologists would strongly prefer to be in a position to intervene—to help enhance the intellectual capacity of all human beings. Evidence favoring a genetic basis for intelligence might seem, at first glance, to rule out such helpful interventions. In fact, however, it does not. Genes do not *fix* or determine behavior; rather, genetic factors establish a range of possible responses to a given environment (Weinberg, 1989). Even if intelligence is strongly affected by genetic factors, therefore, it can still be influenced by environmental conditions. From this perspective, programs designed to enrich

KEY POINT

Intelligence is influenced by a complex interplay between environmental and genetic factors.

the intellectual environments of children from disadvantaged backgrounds may still produce beneficial results. Heredity, in short, should definitely *not* be viewed as a set of biological shackles, nor as an excuse for giving up on children who are at serious risk because of poverty, prejudice, or neglect.

GENDER: How Males and Females Differ

GENDER ROLES BEGIN AT BIRTH

Infants are classified as male or female at birth. From this moment on, their sexual identity plays an important role in the way they are treated by society.

My daughter was born early in 1970, and although much of that eventful day is a blur in my memory, I do remember one scene very vividly. I was sitting in the waiting room when the nurse came out with a bundle in her arms and announced: "Professor Baron, you are the father of a baby girl!" I must have looked totally bewildered because, laughing, she opened my daughter's diaper and said, "Look! See for yourself!" For me, this scene is vivid proof of the fact that at birth, society immediately classifies us as either *female* or *male* on the basis of our *biologically determined sex.* In only a few cases, where it is difficult to tell immediately whether a child is male or female, is this decision delayed (Berenbaum & Hines, 1992).

However, the term **gender** involves much more than biological sex. In chapter 8 we saw that every society has preconceived notions of the traits supposedly possessed by males and females—what psychologists term *gender stereotypes* (Unger & Crawford, 1993). Further, all societies have more or less clearly defined *gender roles*—expectations concerning the roles people of each sex should fill and the ways in which they are supposed to behave (Deaux, 1993). In other words, each society has a set of ideas concerning the nature of *masculinity* and *femininity;* and, as we'll see below, woe to the person who violates these expectations (Aubé & Koestner, 1992).

Because of the existence of gender stereotypes and gender roles, it is difficult to determine whether differences in the behavior of males and females stem from biological differences between them or from the self-fulfilling impact of these stereotypes and roles. This topic arose in chapter 2, and we'll return to it again later in this chapter. For the moment, however, let's put aside the important issue of *why* females and males differ, and turn instead to the questions of *whether* and *how* they differ.

The first issue—do males and females differ in their behavior?—has an increasingly clear answer: Yes, they do. The nature and magnitude of these differences are often quite different from what commonly held gender stereotypes suggest, but there *are* measurable differences between females and males in many respects (Feingold, 1992b; Oliver & Hyde, 1993). What, precisely, are these differences? This is the issue on which we'll focus next.

GENDER DIFFERENCES IN SOCIAL BEHAVIOR

Gender: *All the attributes, behaviors, and expectancies associated with each sex in a given society.*

Many of the traits attributed to females and males in gender stereotypes seem to relate to social behavior—for example, traits like *sensitivity* and *nurturance* on the part of females and *aggressiveness* and *dominance* on the part of males (Eagly, 1987; Friedman & Zebrowitz, 1992). Widely held stereotypes often exert powerful self-confirming effects on behavior; nevertheless, research findings point to the existence of several differences in the social behavior of males and females. While these differences are quite small and subtle in nature, they do seem to exist.

GENDER DIFFERENCES IN THE USE OF NONVERBAL CUES

Females are generally better at both sending and receiving nonverbal cues than males.

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EMOTIONAL EXPRESSION: SENDING AND RECEIVING NONVERBAL CUES

Informal experience suggests that in many social situations, males seem surprised and bewildered by others' behavior. Often males don't expect the people with whom they interact to say or do what they do, and are at a loss to account for such actions after they occur. In contrast, females experience fewer surprises of this type; they seem to know what to expect from others. Are such differences real? A large body of research on the transmission and interpretation of *nonverbal cues* (refer to chapter 10) suggests that they are (e.g., DePaulo, 1992). Nonverbal cues are subtle cues involving facial expressions, eye contact, body posture or movements, and so on. And females seem to be better than males at transmitting their own feelings to others through nonverbal cues, and also at understanding the nonverbal messages sent by others (e.g., DePaulo, 1992; Rosenthal & DePaulo, 1979). Since nonverbal cues often reveal much about others' reactions and emotional states, females' superior skills in these respects are very beneficial in many different social contexts (e.g., Hall & Veccia, 1990). So, in one sense, at least, widely held beliefs about the existence of "feminine intuition"—females' superior ability to predict how others will behave or feel—seem to have a basis in fact.

Offsetting these potential benefits, however, is another gender difference with respect to emotional expression. Gender stereotypes suggest that females are more sensitive and caring than males, so females are expected to express positive emotions toward others to a greater extent than males. Interestingly, this difference does not apply to expressing positive emotions about *themselves* or their own accomplishments—it applies only with respect to expressions of positive emotion toward others (Stoppard & Gruchy, 1993). In other words, females experience considerable pressure to express positive emotions to *others:* to act in ways consistent with gender stereotypes suggesting that they are kind, nurturant, and sensitive. In contrast, males experience less pressure of this kind and are also encouraged, to a greater degree than females, to express positive emotions about their own accomplishments. As you can see, this is one way in which gender stereotypes are self-confirming: They induce people to act in ways that confirm their accuracy.

SOCIAL INFLUENCE: ARE FEMALES MORE SUSCEPTIBLE, AND IF SO, WHEN?

At one time in the past, it was widely assumed that females are more susceptible to various forms of *social influence*—efforts to change their attitudes or behavior—than males. As I'll explain in detail in chapter 16, however, research findings on this topic indicate that in fact there are no overall gender differences in this particular respect (e.g., Maupin & Fisher, 1989). Yet this does not mean that there are *no* differences between females and males with respect to social influence. In fact, there is growing evidence that some differences of this type do exist (e.g., Graziano et al., 1993).

Perhaps the most important of these relates to reactions to feedback from others. Several studies indicate that women's evaluations of their own perfor-

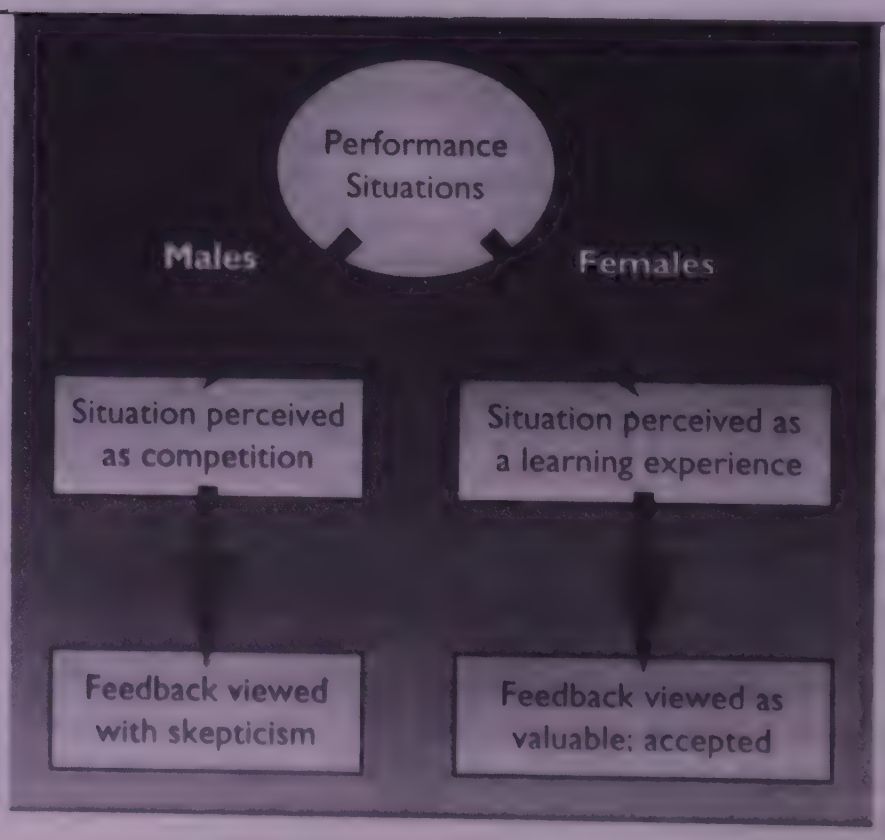
mance in achievement situations are more strongly influenced by such feedback than are men's self-evaluations (Eagly & Carli, 1981; Roberts, 1991). For instance, consider a study on this issue by Roberts and Nolen-Hoeksema (1990). They asked male and female students to deliver speeches on topics that were important to them. Then the students received prearranged positive or negative feedback about their speeches from audience members. Finally, both before and after receiving the feedback, the students rated their own performance. Results indicated that only the women changed these ratings in response to the feedback they received. If they received positive feedback, they raised their self-evaluations; if they received negative feedback, they lowered them. In contrast, men did not change their self-evaluations in response to the feedback.

Why are females influenced to a greater extent than males by evaluative feedback? According to Roberts (1991), several factors may play a role. First, because women generally have lower social status then men, they may have less information about themselves and so be more dependent on obtaining that information from others. Second, some studies indicate that females generally receive less evaluative attention in school and elsewhere than do males (e.g., Minuchin & Shapiro, 1983). As a result, they may perceive evaluative feedback as more informative than males do, and so take it more seriously. Finally, and perhaps most important of all, males and females may approach achievement situations somewhat differently. Males tend to perceive such situations as competitive challenges. They perceive others as actual or potential competitors, and so they view feedback from others with skepticism and tend to ignore it—especially if it is negative! In contrast, females may approach achievement situations as opportunities to learn about their skills and abilities. Thus, they view others' evaluations as highly informative and pay careful attention to them (see Figure 11.10). To the extent these differences exist, it is not surprising that females' self-evaluations are influenced by feedback from others to a greater degree than are males' self-evaluations. However, it's important to realize that at present there is little direct evidence concerning these suggestions. Thus, they must be subjected to careful test before they can be accepted with confidence.

FIGURE 11.10

Evaluative Feedback: Contrasting Reactions among Females and Males

Males tend to view situations in which they receive feedback on their performance as competitive ones. As a result, they view such feedback with skepticism. In contrast, females view such situations as learning opportunities and therefore pay greater attention to the feedback they receive.
(*Source:* Based on suggestions by Roberts, 1993.)



Leadership: Performance and Evaluations Do male and female leaders differ in their style of leadership? While there is a widespread belief that they do, systematic research on this issue suggests that in general, they actually do not (Powell, 1990). Female and male leaders appear to differ in a few respects, but these differences are smaller in magnitude and fewer in number than gender-role stereotypes suggest. Evidence pointing to these conclusions has been collected by Eagly and her colleagues in a series of careful reviews of existing research evidence—reviews employing the technique of *meta-analysis* described in chapter 1.

The first of these reviews (Eagly & Johnson, 1990) examined more than 150 separate studies of leadership in which comparisons were made between female and male leaders. The researchers examined potential differences between male and female leaders with respect to two dimensions generally viewed as important aspects of leader behavior: (1) concern with good interpersonal relations (often termed *showing consideration*) versus concern with task performance (known as *initiating structure);* and (2) *participative* versus *autocratic* decision-making style. Gender-role stereotypes suggest that female leaders might show more concern with interpersonal relations and might tend to make decisions in a more participative manner than male leaders. Results, however, offered only weak support for such beliefs. With respect to the first dimension—interpersonal relations versus task orientation—there were few significant findings. For decision-making style, however, females did appear to adopt a more democratic or participative style than males. All in all, there were few differences between female and male leaders, and the differences that did emerge were smaller than suggested by gender stereotypes.

In a follow-up investigation, Eagly and her colleagues (Eagly, Makhijani, & Klonsky, 1992) focused on a related issue: Are female and male leaders evaluated differently by others? Because serving as a leader is in some respects contrary to the gender stereotype for females, the researchers predicted that female leaders might receive lower ratings than male leaders, even when their performance was identical. Moreover, Eagly and her coworkers also expected that such down-rating of female leaders would be greater among male evaluators than among female evaluators, and would be more likely to occur in fields that were male-dominated and in situations in which the female leaders adopted a directive, autocratic style of leadership—a traditionally "masculine" leadership style. A meta-analytic review of more than sixty different studies provided support for all of these predictions. Overall, the tendency for female leaders to be rated lower than male leaders was significant, but quite small in magnitude. This is an encouraging finding, suggesting, perhaps, that bias against female leaders is decreasing. However, the down-rating of female leaders was stronger when they adopted a style of leadership viewed as stereotypically masculine (autocratic, directive), when the evaluators were male, and when the women occupied leadership roles in fields where most leaders were males. (See chapter 17 for further discussion of leadership.)

Female Leaders: Often They Are Down-Rated

Research suggests that female leaders often receive lower ratings than male leaders, even when their performance is the same. This finding is especially strong in situations where the raters are males, the female leaders adopt a "masculine leadership style," and most leaders in that particular setting are male.

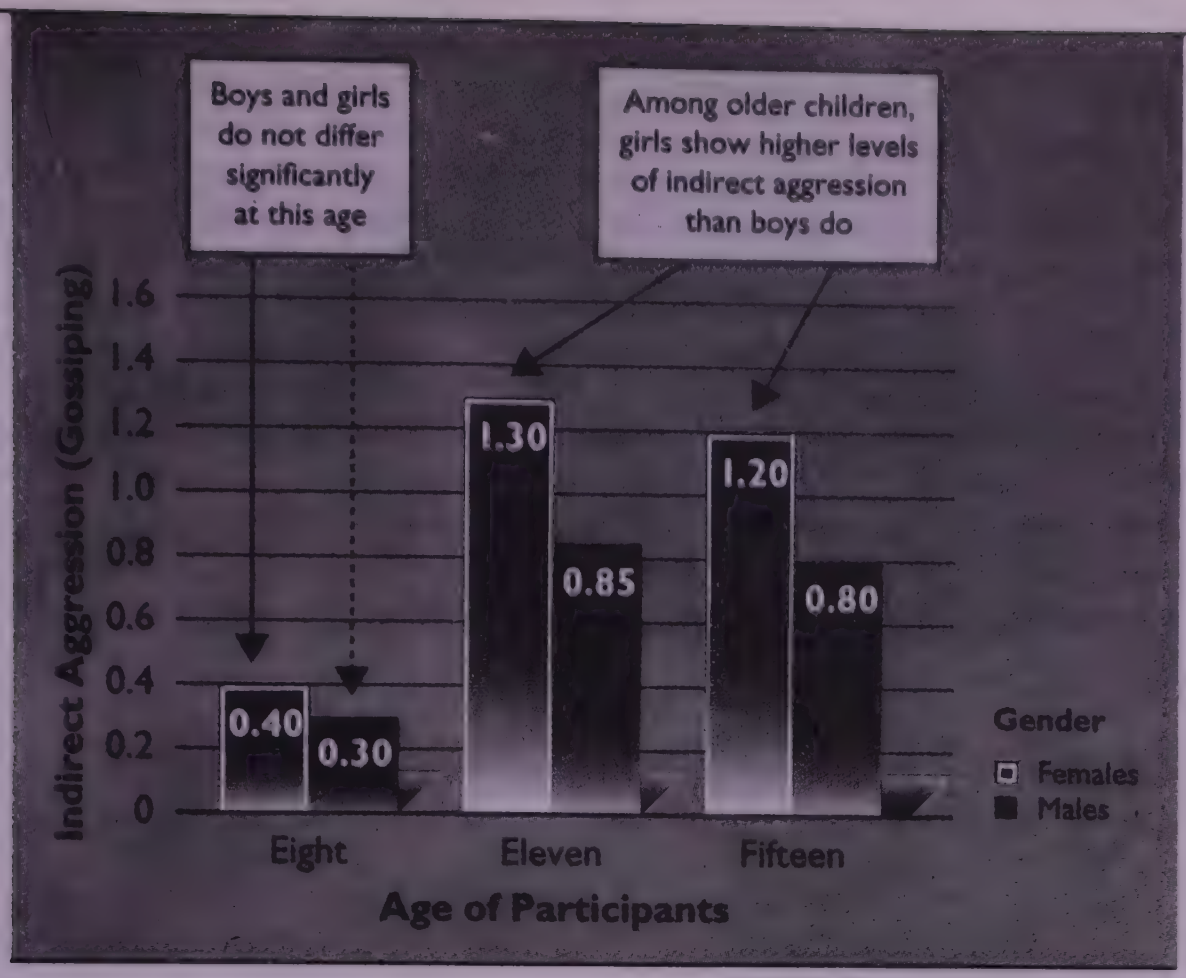
Combining the findings reported by Eagly and her colleagues with those of other studies (e.g., Powell, 1990), it appears that female leaders continue to face disadvantages in many settings. While their behavior or style differs from that of male leaders in only a few relatively minor respects, female leaders continue to receive lower ratings than their male counterparts. It can only be hoped that this situation will change in the years ahead, as gender stereotypes weaken and as the number of females in leadership positions continues to increase.

AGGRESSION: WHAT KIND AND HOW MUCH? Are males more aggressive than females? Gender stereotypes endorse this view, and crime statistics seem to support the stereotype: Males are much more likely than females to be arrested and convicted for violent acts. Does this mean that large differences actually exist between males and females with respect to overt aggression? Once again, systematic research provides a mixed answer. Males do seem to be more likely both to instigate aggression and to be its target (e.g., Baron & Richardson, 1994; Bogard, 1990; Harris, 1992, 1994). However, on closer inspection the size of this difference appears to be relatively small, and it varies across different situations; in fact, females are actually more aggressive than males in some contexts—for example, ones involving flirting by a romantic partner (Harris, 1994). Further, the tendency for males to engage in aggressive actions more frequently than females is greater for *physical* forms of aggression (hitting, kicking, use of weapons) than for other forms of aggression (yelling at people, treating them in a condescending manner) (Harris, 1992). In fact, recent findings indicate that females may actually be *more* likely than males to engage in various *indirect* forms of aggression, such as spreading rumors about another person, rejecting someone as a friend, or ignoring or avoiding a target person (Lagerspetz, Bjorkqvist, & Peitonen, 1988). Precisely such effects have been found by Lagerspetz and her associates in a series of revealing studies.

In one of these investigations (Bjorkqvist, Lagerspetz, & Kaukiainen, 1992), boys and girls in three age groups—eight, eleven, and fifteen years old—were asked to indicate how other members of their class in school reacted when they became angry. Responses were then divided into three categories: *direct aggression* (classmate kicks or strikes others, uses profanity, pushes or shoves); *indirect aggression* (gossips, says "I'm not your friend," shuns the target person); and *withdrawal* (goes away, sulks). The researchers predicted that girls would be more likely than boys to use indirect aggression or withdrawal at all ages, but that such differences would strengthen with increasing age, as the cognitive skills needed for use of indirect forms of aggression developed. As shown in Figure 11.11, this is precisely what was found. Boys were more likely to use direct forms of aggression than girls at all ages. Similarly, girls were more likely to use indirect forms of aggression at all ages, although this difference was smallest among eight-year-olds and largest among the older children.

Given that females are generally smaller in size and physical strength than males, it is not surprising that they make greater use of indirect modes of aggression. However, as with other gender differences, this difference probably stems in part from gender stereotypes suggesting that males *should* be tough and aggressive while females should be nurturant and forgiving.

The impact of such factors is clearly indicated in studies conducted by Lightdale and Prentice (1994). These researchers found that females were *not* less aggressive than males under conditions where they were made to feel *deindividuated*—anonymous and unaccountable for their actions. Under these conditions, Lightdale and Prentice had reasoned, the impact of gender roles should be weakened. Thus, if gender roles account for lower levels of aggres-



Gender Differences in the Use of Indirect Aggression

While boys show more *direct aggression* at all ages than girls, girls show more *indirect aggression* against others. This difference increases with age and girls' growing cognitive skills.
(*Source:* Based on data from Bjorkqvist, Lagerspetz, & Kaukiainen, 1992.)

sion on the part of females, these differences should tend to disappear when the influence of gender roles is minimized. The fact that this is precisely what occurred points to the following conclusions: Females are not inherently less aggressive than males; rather, they engage in aggressive behavior less frequently or intensely because social norms come down harder on females than on males for such actions.

Friendships: Are Female Friendships More Intense—and Beneficial? When do you seek the company of your close friends? When you want to engage in some activity you and your friends enjoy, or when you feel the need to share your inner feelings and thoughts or to ask for emotional support? While persons of both sexes seek contact with their friends for all these reasons, there appear to be some interesting gender differences in this respect. Males more often hang out with friends in order to participate in shared activities, while females more frequently spend time with friends to discuss feelings and thoughts and to obtain social support (Barth & Kinder, 1988). Moreover, although females and males report having about the same number of close friends, females report greater satisfaction with these friendships (Reis, Senchak, & Solomon, 1985). Finally, close friendships seem to be more beneficial for females than males, at least with respect to reducing unhappiness and raising self-esteem.

In a recent study concerned with these differences, Elkins and Peterson (1993) asked male and female students to describe their relationships with their actual best friends and with what would be their *ideal* best friends. In addition, par-

Key Points

- The term *gender* refers to more than biological sex; it includes references to gender stereotypes and gender roles.
- Females are better than males at both sending and reading various nonverbal cues. However, they experience greater social pressure to express positive emotions toward others.
- There are no overall differences between males and females with respect to susceptibility to social influence. However, females are often influenced more than males by evaluative feedback about their performance.
- Female and male leaders do not appear to differ greatly in terms of style or performance. Yet, female leaders often receive lower evaluations than male leaders.
- Males engage in acts of direct physical aggression more often than females. However, females engage in more acts of indirect aggression.

ticipants completed measures of their current self-esteem and of the extent to which they were feeling depressed. These two scales were combined in a single measure of current *dysphoria*—a rough index of unhappiness. Results indicated that, in general, females were more satisfied with their actual friendships than were males. In addition, the greater the disparity between actual and ideal friendships, the greater dysphoria, or unhappiness, reported by *both* females and males. This finding suggests that both sexes rely on close friendships for emotional and social support. However, since females report greater satisfaction with their current friendships, they appear more likely to derive such benefits than males. In any case, male and female friendships do seem to differ in some respects; and, once again, these differences are relatively consistent with gender stereotypes and gender roles.

Mate Selection, Relationships, and Sexuality

Female, 30, smart, pretty, sensuous, lots to offer, seeks wealthy man to show me life of luxury and love.

Single white female, 22, athletic, blonde, blue eyes, college graduate, seeks single white male who is honest, romantic, spontaneous, to have fun and build relationship.

Single white male, scientific professional; successful, fit, handsome, witty, but lonely. Looking for single/divorced female to marry. I'm tired of the single life.

Male, 40, fit, attractive, professional; caring, funny, looking for attractive female 30's, for fun, good conversation, quiet times, romance.

These are actual "personal" ads from the "Getting Together" column of my local newspaper. If you read these and other personals carefully, an interesting pattern emerges: Females and males seem to be seeking—and offering—somewhat different packages of traits. Many such ads placed by females indicate that the person advertising is young and physically attractive and is seeking a partner who has wealth or high status *and* who is interested in a serious relationship. In contrast, many ads placed by males indicate that the advertiser *has* high status (education, wealth, professional standing) and is seeking a partner who is young and attractive. In addition, such ads also frequently indicate that the men who have placed them are sincere and reliable and that they, too, are searching for a stable relationship.

All in all, then, an analysis of these ads points to two conclusions: (1) There are interesting differences in what females and males seek in potential mates; and (2) both sexes seem to be well aware of these differences! Ads in personal columns, of course, do not provide a very strong basis for reaching conclusions about gender differences. But in fact a substantial body of research evidence indicates that the patterns appearing in the personals may be quite real (Feingold, 1992a). Why would this be the case? Why, in short, would males tend to seek youth and physical beauty in potential partners while females tended to seek high status, ambitiousness, intelligence, and such traits as sincerity?

Parental Investment Model: *The view that males and females adopt contrasting strategies of mate selection because they invest different amounts of resources in their offspring.*

One theory, favored by *evolutionary psychologists* and *sociobiologists*, suggests that the answer lies in biological differences relating to reproduction. This view, known as the **parental investment model** (Trivers, 1985), contends that for men the investment of time and effort in producing offspring is

relatively small: Each man can father numerous children with many different women. Thus, in choosing potential mates, men need only seek ones who are capable of reproducing—women who possess youth, physical attractiveness, and other outward signs of good health and vigor. In contrast, for women, the investment of time and energy in each child is very large. Therefore, it is reasonable for women to seek potential mates who can help share the burden of raising these children; and males with high status, ambition, and intelligence fill the bill. In addition, since it's important that potential mates remain on the scene for many years, women should also favor men who are sincere, honest, and willing to form long-term relationships.

Some research findings are consistent with predictions derived from this theory. For example, in a recent meta-analysis of the findings of several dozen studies on the characteristics sought in potential mates by females and males, Feingold (1992a) found that in selecting potential mates, females did give greater weight than males to success (as indexed by socioeconomic status), ambition, and intelligence. This was true both in studies using questionnaires and in ones that analyzed the contents of personal ads such as the ones above. Further, when Feingold (1992a) examined the results of studies conducted several decades ago, similar results were obtained: In the 1940s and 1950s, too, females assigned greater weight to status, intelligence, ambition, and character, while males assigned greater weight to physical attractiveness (Hill, 1945; McGinnis, 1958). Finally, and perhaps most impressive of all, similar findings have been found around the world, in samples drawn from thirty-three different countries (Buss et al., 1990). In sum, there do appear to be reliable, and quite general, differences in the weights attached by females and males to various factors in their choices of romantic partners or potential mates. While these results are consistent with the parental investment model, however, they can also be explained in terms of social factors as well. Please see the **Research Process** section below for a discussion of this issue.

Matching Hypothesis: *The hypothesis that individuals seek romantic partners whose desirable characteristics are at least equal to their own level of desirability.*

The Research Process

Integrating the Evolutionary and Social Exchange Models of Mate Preferences: Taking Account of Our Own "Market Value"

Long before the field of evolutionary psychology emerged, social psychologists noticed an interesting phenomenon: romantic partners are often quite similar in physical attractiveness. Highly attractive persons have highly attractive partners, average persons have average ones, and so on. This led to formulation of the **matching hypothesis**—the suggestion that people tend to choose romantic partners who are similar to themselves in attractiveness (Berscheid et al., 1971; Kalick & Hamilton, 1986). Many studies provided support for this view (Forgas, 1993), but it soon became apparent that physical attractiveness is only one of the factors that may be involved in determining our "exchange value" in the romantic marketplace. Thus, the matching hypothesis was soon expanded to suggest that people match on their *overall personal appeal*—not just on physical beauty. Factors such as wealth, education, status, and charm all play a role, and the general rule is: The more of these desirable characteristics an individual possesses, the more desirable the partners she or he can obtain (Hatfield & Rapson, 1993). This is why, for example, older males who possess wealth and status often seek—and attract—younger females, a pattern that is fairly common throughout the world (Kenrick & Keefe, 1992). The older males are trading high status and wealth for the youth and physical charms of their partners. Older, high-status females can follow the same strategy, exchanging *their* desirable social characteristics for the physical attractiveness of younger males.

In short, the matching hypothesis and related ideas about *social exchange*—what we bring to a relationship and what we receive from it—offer an alternative interpretation for the tendencies of males and females to

emphasize different factors in the process of mate selection. According to this model, both sexes seek to obtain the best possible bargain in romantic partners—the most desirable ones they can obtain, but the two sexes bring somewhat different personal assets to the table.

Integrating the Evolutionary and Social Exchange Perspectives

At first glance, the social exchange and evolutionary perspectives on mate selection might seem to be incompatible. The matching perspective suggests that males and females both follow the same strategy with respect to mate selection: try to get a partner at least as desirable as oneself. In contrast, the evolutionary perspective suggests that males and females may adopt contrasting approaches, and will attach different values to various characteristics such as physical beauty. However, Kenrick and his colleagues (Kenrick et al., 1993) have pointed out that the two perspectives may actually be *complementary* rather than incompatible. They reason as follows.

First, it makes good sense, from an evolutionary perspective, for *both* males and females to be aware of their relative desirability and to seek to obtain partners who are at or slightly above their own level. After all, if people don't take account of their own level of desirability, they may waste lots of time and energy competing for mates they can't reasonably expect to obtain. So social exchange theory helps to expand evolutionary theory by calling attention to the importance of *self-appraisal*—accurate knowledge of our own desirability.

Second, and conversely, evolutionary theory helps to expand social exchange theory by noting that males and females may differ in their tendency to seek such matching, depending on the nature of a relationship. In long-term relationships such as marriage, both females and males should be concerned with obtaining a mate whose desirability at least equals their own. In short-term flings or one-night stands, however, females may retain higher minimum standards than males, since (in an evolutionary sense) they invest so much more in potential offspring.

Integrating these two theories, then, leads to an interesting prediction that would not be generated by either theory alone: For females, the relationship between their self-appraisals of their own desirability and the *minimum standards* they require for potential partners will be relatively strong for both long-term and short-term relationships. For males, however, this link will be stronger for long-term than short-term relationships. To test this prediction, Kenrick and his colleagues (1993) conducted research in which they asked female and male students to indicate the minimum standards they would require for entering into five different relationships with another person: a single date, steady dating, sexual relations, marriage, or a one-night stand. The students rated the minimum they would require from potential partners in terms of attractiveness, status, agreeableness, intellect, and several other dimensions. In addition, participants rated themselves on the same dimensions. (See Figure 11.12.)

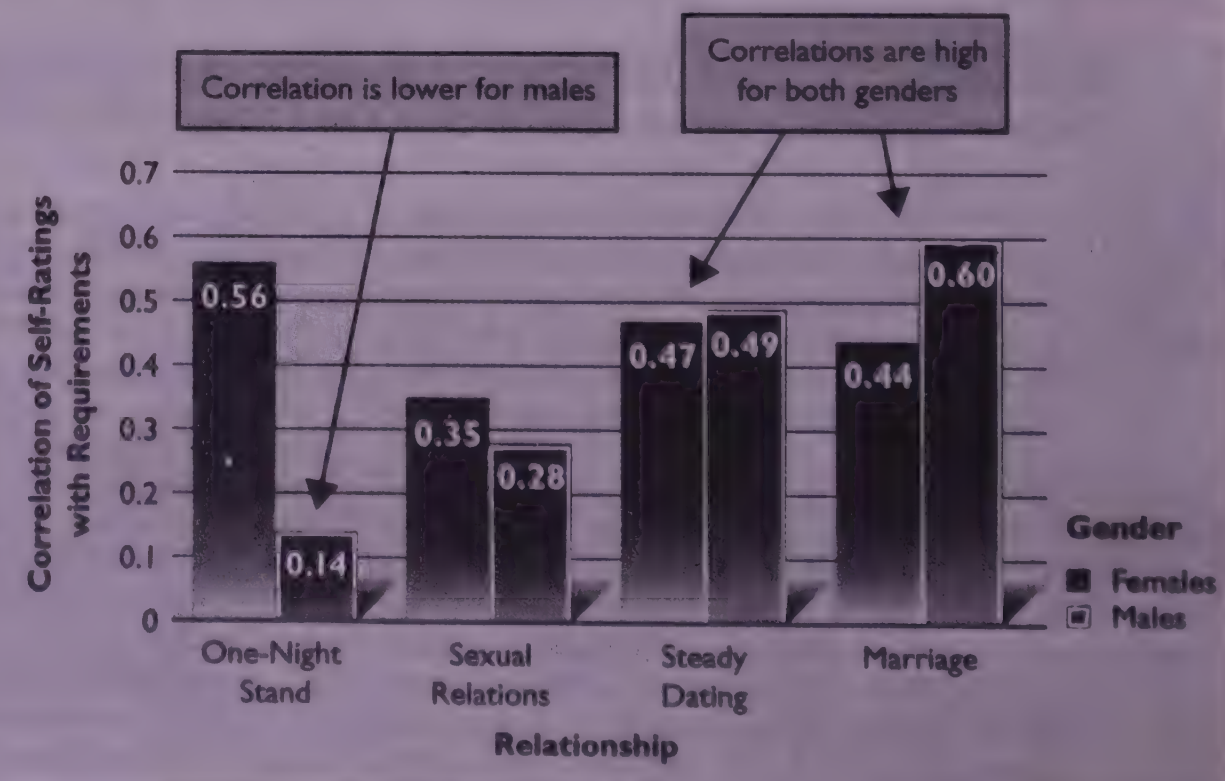
Results indicated, first, that women required higher minimum standards than men for entering *all* of the relationships. This is consistent with evolutionary theory, which emphasizes the large investment females make in each of their children. Second, as

Figure 11.12

Matching One's Own Assets in Romantic Relationships: Some Gender Differences

Males and females show equal degrees of matching with respect to long-term relationships such as marriage, but different degrees of matching for one-night stands. For one-night stands, males show lower tendencies toward matching than females. That is, more attractive males don't necessarily seek more attractive partners; rather, males seem willing to accept a wide range of partners in this context.

(*Source:* Based on data from Kenrick et al., 1993.)



expected, the correlations between females' self-appraisals of their own desirability and the minimum standards they required for potential partners were high across all five relationships. Third, as predicted by the integrated theory, the size of these correlations varied for males across the relationships. The correlation was as high as that for women with respect to marriage, but was considerably *lower* for a one-night stand. In that context, men indicated that they would not necessarily try to get a partner at least as desirable as themselves: They would settle for just about anyone!

These results suggest that the evolutionary and social exchange perspectives truly are complementary. Evolutionary theorists have often ignored the impact of different relationship levels, while exchange theories have generally overlooked differences in the selection strategies employed by females and males. By combining these perspectives, therefore, we can obtain a fuller and richer picture of how, and why, people go about selecting everything from casual romantic partners to lifelong mates.

CRITICAL THINKING QUESTIONS

1. If people seek romantic partners at least equal to themselves in attractiveness, do you think that the degree of similarity on this dimension will increase as relationships become more serious?
2. Suppose that one member of a couple becomes more desirable over time—earns an advanced degree or inherits great wealth, for example. Will this threaten the stability of the relationship?
3. The participants in Kenrick and colleagues' (1993) research were college students. Do you think similar findings would be obtained with older participants? If so, why? If not, why?
4. Suppose you went to bars and observed couples who met for the first time and then left together. Would you predict major differences in physical attractiveness between the females and the males in the couples, or would they generally be similar in this respect?

Now for another fascinating question: Does the fact that males attach greater importance to physical attractiveness indicate that females are uninfluenced by this factor? Research conducted by Graziano and his colleagues (1993) indicates that this is definitely not the case. On the contrary, women seem to be just as sensitive to differences along this dimension as men. However, it also appears that for females, making judgments about others' physical attractiveness may involve more complex processes than is true for men. For example, in one study on this topic (Graziano et al., 1993), female and male students looked at photos of men and women previously rated as being average in attractiveness, and rated the attractiveness of the persons shown. Before doing so, the students also received prearranged information indicating that members of their own sex had rated some of the persons in the photos as either very attractive or very unattractive. (For some photos, there were no ratings.) Results indicated that females were strongly influenced by the bogus ratings they received: Their ratings were higher when other people had supposedly rated the stimulus persons as attractive, and lower when others had supposedly rated the stimulus persons as unattractive. These effects were *not* found for males.

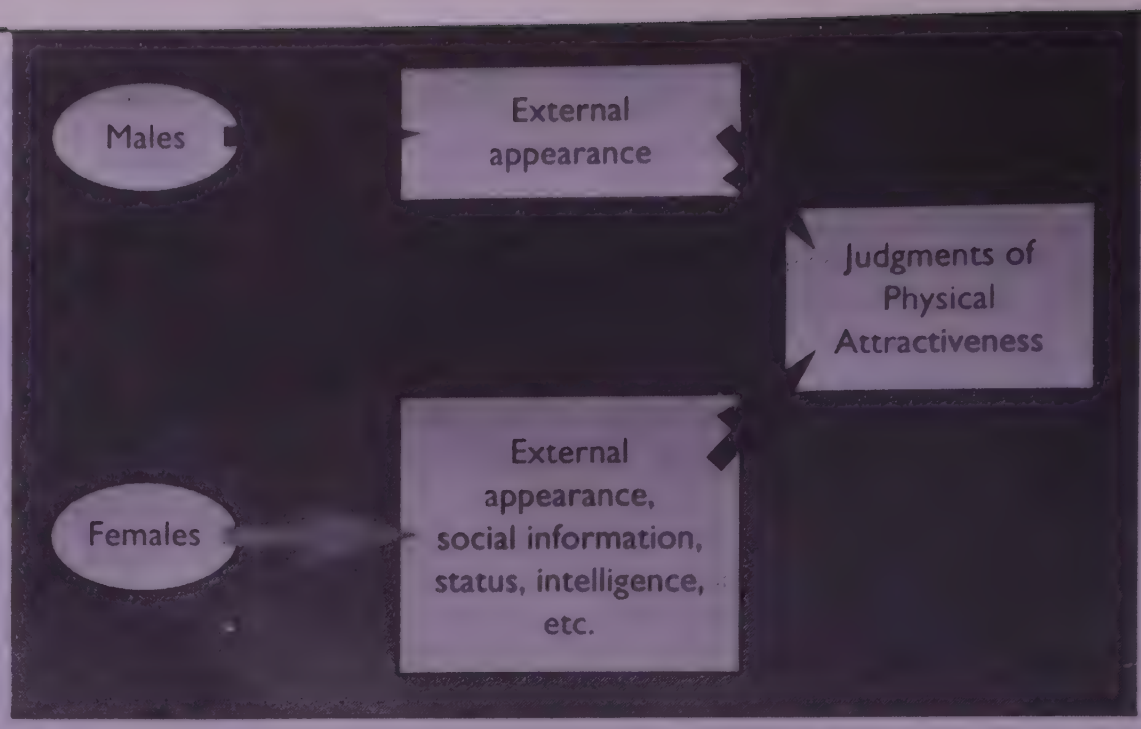
Graziano and his colleagues (1993) interpret these findings as suggesting that males' ratings of physical attractiveness are relatively automatic: They occur without much thought or attention to social information. For females, however, this process is more complex: Females take several factors into account when judging attractiveness, including others' opinions. In sum, both sexes are influenced by and sensitive to physical beauty, but the factors affecting their judgments of attractiveness may differ somewhat (see Figure 11.13 on page 448).

SEXUALITY: ATTITUDES AND BEHAVIORS If there is one area of behavior where cultural beliefs suggest the existence of large differences between females and males, it is with respect to sexuality. Sexual attitudes and behaviors vary from culture to culture, but in the United States and many other countries, it has long been, and to some extent still is, assumed that males are more permissive

FIGURE 11.13

How Females and Males Judge Attractiveness

Among males, judgments of physical attractiveness appear to be relatively automatic; they are based largely on outward appearance. For females, in contrast, judgments of attractiveness are more complex and involve attention to social information and other characteristics aside from physical appearance. (*Source:* Based on suggestions by Graziano et al., 1993.)



in their attitudes about sex and more interested in varied forms of sexual behavior than females. Moreover, elements of the *double standard,* which traditionally permitted or even encouraged premarital sexual experience for males but forbade such experience for females, persist. It's important to bear in mind that attitudes about sex are a very personal matter and are often strongly affected by religious and moral principles outside the realm of science. However, psychologists have attempted to determine whether females and males actually do differ in their attitudes about sex and in their actual sexual practices; these are the questions on which we'll focus here.

While research on these differences has continued for decades (Kelley & Byrne, 1992), perhaps the most revealing recent evidence has been provided recently by Oliver and Hyde (1993). These researchers conducted an extensive meta-analysis of almost two hundred studies that compared the sexual attitudes and behavior of females and males. Results indicated that several notable differences do indeed exist. With respect to attitudes about sex, the largest difference involved acceptance of casual premarital sex: Males reported much more permissive attitudes about such actions than females. In addition, males also reported more permissive attitudes about extramarital sex, and greater sexual permissiveness generally—more positive views about having many different partners, belief that extensive sexual experience is acceptable, and so on. Interestingly, there were *no* differences between females and males with respect to attitudes about homosexuality, sexual satisfaction, masturbation, oral sex, and kissing. As for actual sexual behavior (rather than attitudes), males reported a higher incidence of masturbation than females, a higher incidence of sexual intercourse, a larger number of partners, and a lower age of first sexual intercourse.

Another finding of the meta-analysis, and one of considerable importance, was that the magnitude of the differences between female and male attitudes and behaviors tended to decrease over the years. Studies conducted in the 1960s reported more differences, and considerably larger ones, than those conducted in the 1980s. In sum, there are indeed some differences between females and males with respect to sexual attitudes and sexual behavior. However, the size

KEY POINTS

- Females and males differ to some extent in the characteristics they seek in potential mates. Females often seek high status, ambition, and intelligence in romantic partners, while males tend to emphasize youth and physical attractiveness.
- Both parental investment theory and social exchange theory help to explain these differences.
- Females and males differ to some extent with respect to their sexual attitudes and sexual behavior. Males are more accepting of casual sexual encounters and express more permissive attitudes toward extramarital sex.
- Males report a higher incidence of masturbation, a greater incidence of intercourse, and more partners.

of these differences appears to be decreasing. Whether the differences will totally disappear in the future is a question that only time—and additional research—can answer.

Gender Differences in Psychological Adjustment

Gender stereotypes suggest that females are more emotional than males and experience wider swings in mood, but in fact there is very little evidence for the validity of such views (Strickland, 1992). On the other hand, however, there *are* sizable differences between females and males with respect to one important psychological disorder, *depression*. Around the world, females are more than twice as likely to suffer from some forms of depression than males (Nolen-Hoeksema, 1990). They are much more likely to experience such symptoms as persistent feelings of sadness; loss of energy; and reduced pleasure in activities that are normally quite enjoyable, such as eating and sex. Why is this the case? Biological factors may play some role. For example, use of oral contraceptives seems to cause depression in some women, and menopause brings feelings of depression for a small percentage of females (Stanton & Dunkel-Schetter, 1991). However, as noted recently by Strickland (1992), psychological and cultural factors probably play a much stronger role.

First, as chapter 14 will explain in more detail, depression often involves feelings of *helplessness*—the sense that one cannot change unpleasant or stressful life situations. Because of their lower power, status, and income, females seem especially at risk for experiencing such feelings. Second, sexual and physical violence against women has risen to truly alarming levels in the United States and other nations. The burden of constantly worrying about their personal safety is a heavy one for many women—especially those living in poverty—and may contribute to the high incidence of depression among females (Strickland, 1992). Third, females experience *sexual harassment* and discrimination based on gender much more often than males. These factors, too, may contribute to their greater tendency to experience depression. In fact it is reasonable to ask: Wouldn't males, too, be at increased risk for depression if they experienced the dangers, restrictions, and limitations many societies have placed, and continue to place, on females? (Females are also more likely than males to experience serious *eating disorders;* please see chapters 10 and 14 for discussions of these disorders.)

Another problem of adjustment faced by at least some females has important implications for careers in the industrialized West: the greater tendency of females than males to experience **mathematics anxiety**. Largely because of gender stereotypes and related child-rearing practices, apparently, many girls grow up believing that they do not have the ability to understand mathematics. Clearly, this can restrict their career goals in important ways (Chipman, Brush, & Wilson, 1985). Unfortunately, even highly intelligent females seem to experience this perception. A study conducted with freshmen at a prestigious women's college (Chipman, Krantz, & Silver, 1992) found that sizable proportions of these females experienced math anxiety. Further, the greater such anxiety, the lower the students' reported likelihood of entering fields such as chemistry, engineering, or physics.

Mathematics Anxiety: *Fear on the part of individuals that they cannot master the concepts or operations of mathematics.*

At this point I'd like to point out that females are not the only victims of rigid gender stereotypes and roles: Growing evidence indicates that males, too, are adversely affected. Let's review some of the evidence relating to such effects. First, however, I should clarify one important fact: gender identity is *not* a single dimension, with *masculine* at one end and *feminine* at the other. Rather, masculinity and femininity are better viewed as two independent

dimensions, along which individuals vary. Thus, a given person can be anywhere from high to low in femininity and, at the same time, anywhere from high to low in masculinity (Bem, 1974; Spence, Helmreich, & Stapp, 1975). In fact, recent evidence suggests that the picture may be even more complex than this, and that individuals can accept some aspects of their society's gender stereotype while rejecting others. Thus, gender may actually involve a multiplicity of dimensions instead of only one or two.

Much research on gender stereotyping has focused on the question of whether persons who are clearly *sex-typed*—males who score high on masculinity and low on femininity, and females who score high on femininity and low on masculinity—are more or less well adjusted than those who are **androgynous**—relatively high on both dimensions. While the findings of such research are not conclusive, they generally indicate that androgynous persons enjoy some advantages. Such persons appear to be happier, better adjusted, and more adaptable than persons who are strongly and traditionally sex-typed (Major, Carnevale, & Deaux, 1981; Rosenzweig & Darley, 1989).

There appears to be one important exception to this pattern, however: Males who score relatively high on femininity tend to show *lower* adjustment than those who score low on femininity (Aubé & Koestner, 1992). Why would this be so? One possibility may involve the fact that males generally hold more traditional gender stereotypes than females (Orlofsky & O'Heron, 1987). Thus, they experience considerable stress when they find that their interests and behaviors don't match the masculine stereotype. Another possibility, noted by Aubé and Koestner (1992, p. 491) is that while recent changes in many societies have made it more acceptable for females to show interests and characteristics generally attributed to males, corresponding opportunities have not developed for males. In other words, males are still expected to show traditionally masculine characteristics, and there is little acceptance of males who evidence traditionally feminine interests or traits. Further research is needed to investigate these and other possibilities. Regardless of the outcome of such studies, one conclusion seems clear: Males who demonstrate interests or behaviors viewed by their society as being *feminine* are at considerably greater risk for maladjustment than females who demonstrate interests or behaviors viewed as being *masculine*.

Cognitive Abilities

It is widely assumed that females have higher verbal abilities than males and that males surpass females in mathematics and in tasks that involve *spatial relations*—the movement of objects in space, or visualization of such movements. Do these cognitive differences actually exist? Research on this question has continued for several decades, and there is now an extensive body of evidence on which to base conclusions. Meta-analyses on these data indicate that while some differences do appear to exist between females and males with respect to various cognitive abilities, such differences are generally smaller than gender stereotypes suggest (Feingold, 1992b; Hyde & Linn, 1988; Hyde, Fennema, & Lamon, 1990). In addition, there has been a tendency for such differences to decrease in magnitude in recent years, especially among adolescents (Feingold, 1992b). Finally, the differences that occur seem to appear among young children, then to decrease or totally vanish during adolescence. Some differences in certain cognitive abilities seem to be present among adults; but, as noted by Feingold (1992b, p. 109), this finding may be due to the fact that adults in many of these studies were born before the 1960s, during a time when gender stereotypes were much stronger than has been true since the advent of the women's movement. Thus, it seems possible

Androgynous: *High in both femininity and masculinity.*

Cognitive Ability	Gender Differences
Vocabulary	No appreciable difference.
Reading	Girls score higher than boys, but this difference disappears in adolescence.
Spelling	Girls score higher than boys.
General information	Males score higher at all ages.
Mathematics	Girls outperform boys in the first two years of high school; this difference disappears by the time they are seniors.
Spatial visualization	Boys score slightly higher than girls, and this difference persists through adolescence.
Perceptual speed	Females score higher than males at all ages.
Memory	No difference between males and females.

Table 11.2

Gender Differences in Cognitive Abilities

Differences between females and males appear to be relatively small in most cases; differences also tend to decrease with age.
(*Source:* Based on data from Feingold, 1992b.)

that even these remaining differences will decrease or disappear in the future. A summary of research evidence concerning differences in cognitive abilities between males and females is presented in Table 11.2.

Gender Differences: A Note on Their Possible Origins

Throughout this discussion I have emphasized the role of cultural and social factors in differences between males and females. This emphasis is consistent with the views of most psychologists, who firmly believe that such differences arise in large measure from contrasting socialization practices for girls and boys, and from the pervasive influence of gender stereotypes and gender roles (Etaugh & Liss, 1992; Stoppard & Gruchy, 1993). How powerful are such influences? *Very* powerful indeed, as illustrated by research conducted by Etaugh and Liss (1992).

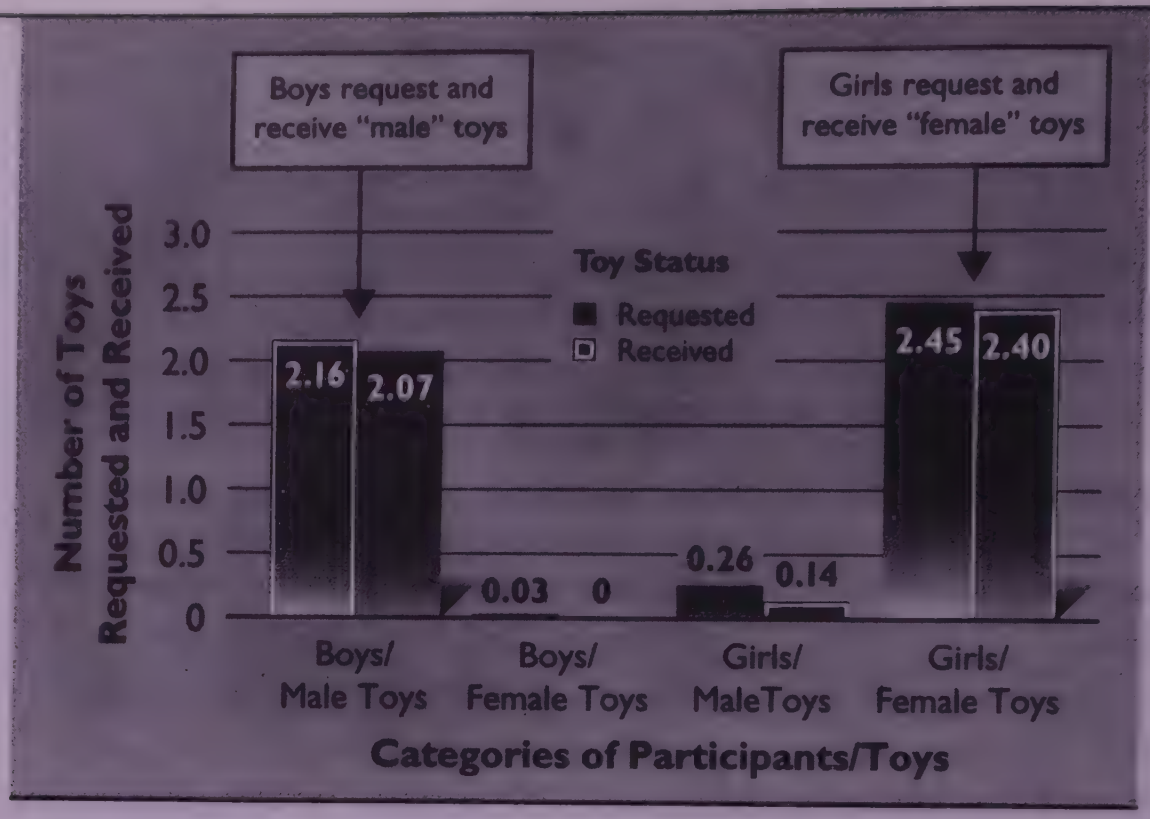
In this study, children of various ages—kindergarten, third grade, sixth grade, and eighth grade—were asked questions about their toy preferences ("What do you want for Christmas?"), the identity of their friends ("What are the names of your friends?"), the chores they were assigned at home, and their career choices. Results clearly illustrated the powerful role of parents and friends with respect to sex-typing. First, as expected, boys requested "male" types of toys while girls asked for "female" toys; and, as shown in Figure 11.14 (on page 452), this, by and large, is what they received. Similarly, boys reported having more male friends and girls having more female friends. Moreover, those who asked for the toys favored by their own sex played most with same-sex friends. As for household chores, more than half the girls had kitchen-related tasks versus only 29 percent of the boys, while boys were more likely to take out the garbage or have no chores. Finally, children who did yard work and took out the garbage were more likely to express interest in occupations traditionally viewed as male (for example, police officer or lawyer) than those who did not perform such chores.

Together, these findings present a picture of a socialization process in which parents behave differently toward girls and boys. This differential treatment is reflected in the children's behavior and influences many aspects of their lives, including preferences for sex-typed toys, choice of friends, and even career aspirations. It is on the basis of such evidence that many psychologists emphasize the role of social and cultural factors in gender differences.

FIGURE 11.14

Sex-Typing in Action

As shown here, boys and girls generally requested toys traditionally viewed as appropriate for their gender, and generally received these toys from parents.
(*Source:* Based on data from Etaugh & Liss, 1992.)



THE POTENTIAL ROLE OF BIOLOGICAL FACTORS Yet this is not the entire story. Growing evidence suggests that *biological factors*, too, may play some role in these differences. This does not in any way imply that differences between females and males are predetermined or unmodifiable—far from it. It simply indicates that there may be biological factors that tend to predispose females and males toward somewhat different patterns of behavior in some situations. Clearly, such biological dispositions can be altered or even reversed by experience or by social and cultural factors. But some evidence indicates that they do exist.

We have already considered this issue in chapter 2, where we saw that there may be subtle differences between the brains of females and males (Berenbaum & Hines, 1992; Law, Pellegrino, & Hunt, 1993). For example, some evidence suggests that the structure of the *corpus callosum*, a broad band of neurons that connects the two hemispheres of the brain, may differ in females and males. Moreover, such differences may be related to subtle differences in cognitive abilities between the sexes, such as higher verbal fluency among females. Additional evidence for the role of biological factors in gender differences comes from studies of persons who have experienced damage to one cerebral hemisphere (Kaufman, 1990). In these studies, males and females seem to show somewhat different effects from such damage. For example, in one study (Turkheimer & Farace, 1992), damage to the *left* hemisphere produced deficits in verbal aspects of intelligence in both males and females. However, reductions in other aspects of intelligence, such as the ability to complete missing parts of pictures, were larger in females than in males. In contrast, damage to the *right* hemisphere, which generated deficits in nonverbal aspects of intelligence for both sexes, produced larger deficits in *verbal* aspects of intelligence among females. Since in most persons the left hemisphere plays a primary role in verbal and the right hemisphere in nonverbal abilities, these findings suggest that damage to a given cerebral hemisphere produces larger deficits in the cognitive functions *for which that hemisphere is nondominant* among

[redacted]NTS

- Females are more likely than males to suffer from depression and eating disorders. In addition, they experience higher levels of math anxiety.
- With the exception of males who are high in femininity, androgynous individuals show better adjustment than those who are traditionally sex-typed.
- Strong evidence indicates that contrasting socialization practices for girls and for boys plus gender stereotypes and gender roles are largely responsible for most gender differences.
- However, some evidence indicates that biological factors play some role.

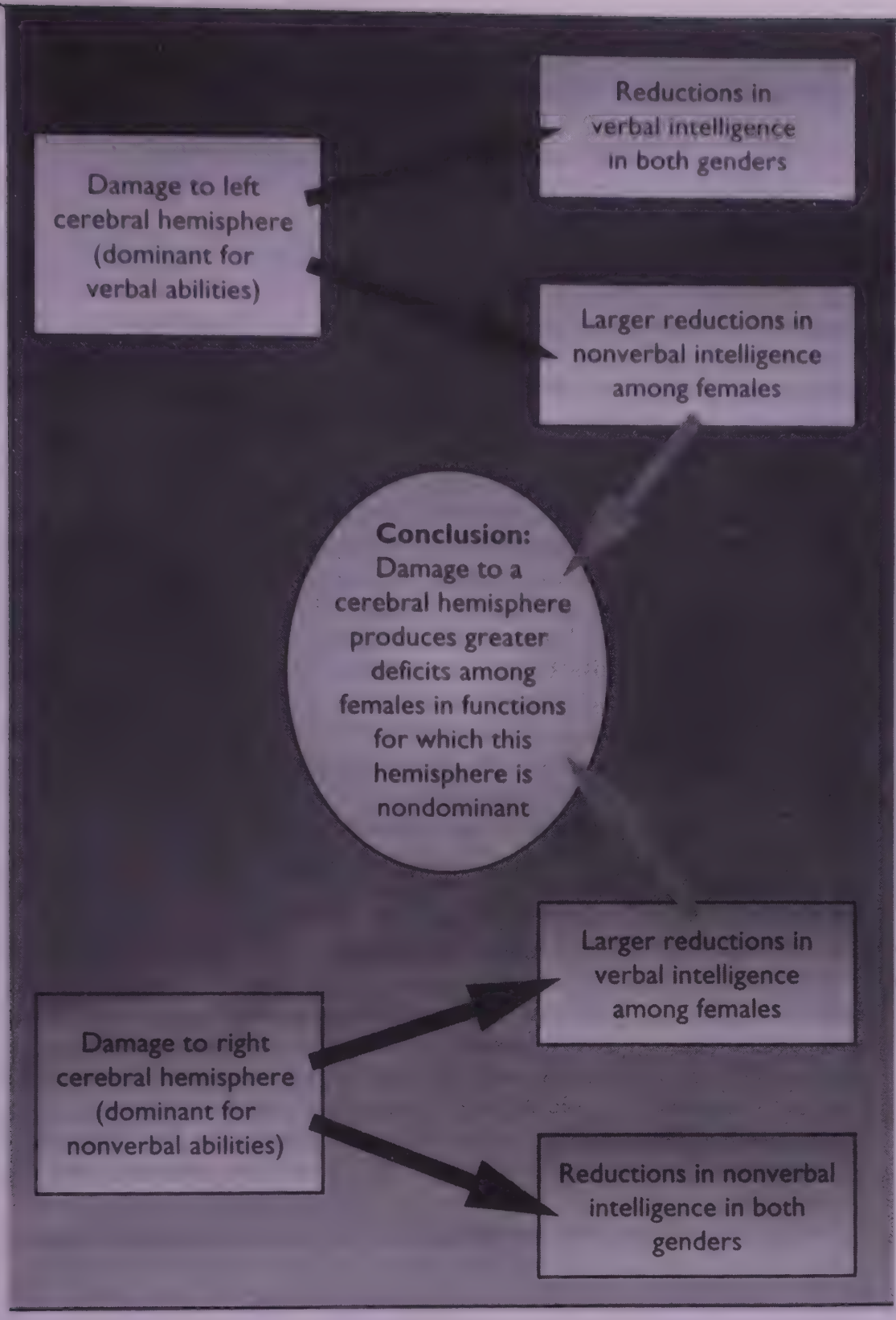


FIGURE 11.15

Contrasting Effects of Brain Damage among Females and Males

Damage to the left cerebral hemisphere produces deficits in verbal intelligence for both males and females. However, reductions in other aspects of intelligence are larger for females. Further, damage to the right hemisphere produces larger deficits in verbal intelligence among females. Together, these findings suggest that females show higher levels of *bilateral processing* than males.
(*Source:* Based on findings reported by Turkheimer & Farace, 1992.)

females than among males (see Figure 11.15). This conclusion, in turn, is consistent with the view that females show higher levels of *bilateral processing* than males; that is, females, more than males, process incoming information in both hemispheres of the brain.

I could go on to cite other evidence, but the main point is probably clear: There do appear to be subtle differences between the brains of females and males, and these differences may influence some aspects of cognitive functioning and overt behavior. So, in this sense at least, biological factors may contribute to gender differences. But please keep firmly in mind the fact that biological tendencies are only one of many different factors affecting behavior, and are *not* irresistible or unmodifiable influences. Indeed, where complex forms of behavior such as leadership, mate selection, psychological adjustment, and aggression are concerned, biological tendencies are almost certainly outweighed by social and situational variables. For additional information on the powerful role of cultural factors in gender-related behavior, please see the **Perspectives on Diversity** section (on page 454).

Work Values and Gender-Role Attitudes across Three Cultures

When I was a boy in the early 1950s, the question "What work roles are appropriate for women and men?" didn't arise. All the women I knew—my mother, my aunts, our neighbors—were full-time homemakers, while all the men worked somewhere outside their homes. I dimly realized that there were other roles for women, since my doctor at the time was a woman, but these seemed far removed from my own life and experience.

Obviously, this situation has changed radically. Today more than 80 percent of female college graduates in the United States are employed outside their homes (Rix, 1990), and similar trends have occurred in many other countries as well. Attitudes concerning appropriate behaviors and roles for women and men have changed greatly too, mirroring—and perhaps contributing to—realities of the modern world. The pace of such change has not been uniform throughout the world, however. In fact, "very spotty" might be an appropriate term to describe the current state of affairs. In many countries major change has occurred, while in many others traditional patterns of behavior and attitude remain largely unaltered (e.g., Gibbons, Stiles, & Shkodriani, 1991). What cultural factors play a role in these differences? And how do cultural factors interact with work-related attitudes to influence gender roles? These questions were the focus of a well-conducted study done recently by Morinaga, Frieze, and Ferligoj (1993).

These researchers examined attitudes of college students in three countries: the United States, Japan, and Slovenia—one of the nations that emerged from the break-up of the former Yugoslavia. Because the cultures of these countries differ in many ways, Morinaga and her colleagues expected that differences would emerge in terms of both work-related attitudes and gender-role attitudes. To find out if this was the case, they asked the students to complete measures of various work-related attitudes (for example, "It is important to me that I have a career, not just a job" and "It is important to me that I become one of the best in my field of work") and also a standard measure of gender-role attitudes. The higher their scores on this measure (the Attitudes toward Women Scale; Spence & Helmreich, 1972), the more *non*traditional were students' views.

Several interesting results emerged. First, it was found that students in the United States were highest in their desire to have a career. Moreover, women in the United States sample actually scored higher in this respect than men. Second, students in the United States and Slovenia were similar in their attitudes about gender roles: both groups held relatively nontraditional views indicating that women as well as men should work outside the home if they so desire, that men should share household tasks, and so on. In contrast, students in Japan held significantly more conservative views. Third, women in all three countries held *less* traditional gender-role attitudes than men; in this sense, they were ahead of their male counterparts with respect to change. Finally, in all three countries, the more nontraditional the gender role attitudes held by women, the greater was their desire for a career.

These findings, and those of related research, indicate that cultural factors do indeed interact with social and economic ones in shaping attitudes about what is and what is not appropriate behavior for both sexes. In a sense, therefore, trying to understand changes in gender roles without careful attention to cultural factors is like trying to read a mystery novel that is missing crucial pages. One could, perhaps, still read and enjoy the book, but the chances of solving the mystery would be very slight.

GENDER ROLES AND STEREOTYPES AROUND THE WORLD

The degree to which traditional gender roles and gender stereotypes are still operating today varies greatly across different cultures. What gender stereotypes can you identify in your everyday life?

Making Psychology Part of Your Life

Measuring Attitudes toward Women: A Short Test for Sexism

Overt discrimination against females has decreased in recent years in many countries, because of growing awareness of this problem and as a result of anti-discrimination legislation. However, people continue to hold divergent views concerning what is and is not appropriate behavior and career activity for women. You can find out where you stand by completing the *Attitudes toward Women Scale* (Spence & Helmreich, 1972), according to the instructions below.

Instructions: The statements below describe attitudes toward the role of women in society. There are no right or wrong answers, only opinions. Express your feeling about each statement by indicating in the space next to it whether you (A) agree strongly, (B) agree mildly, (C) disagree mildly, or (D) disagree strongly.

____ 1. Swearing and obscenity are more repulsive in the speech of a woman than in that of a man.

____ 2. Women should take increasing responsibility for leadership in solving the intellectual and social problems of the day.

____ 3. Both husband and wife should be allowed the same grounds for divorce.

____ 4. Telling dirty jokes should be mostly a masculine prerogative.

____ 5. Intoxication among women is worse than intoxication among men.

____ 6. Under modern economic conditions, with women being active outside the home, men should share in household tasks such as washing dishes and doing the laundry.

____ 7. It is insulting to women to have the "obey" clause remain in the marriage service.

____ 8. There should be a strict merit system in job appointment and promotion without regard to sex.

____ 9. A woman should be as free as a man to propose marriage.

____ 10. Women should worry less about their rights and more about becoming good wives and mothers.

____ 11. Women earning as much as their dates should bear equally the expense when they go out together.

____ 12. Women should assume their rightful place in business and all the professions along with men.

____ 13. A woman should not expect to go to exactly the same places or to have quite the same freedom of action as a man.

____ 14. Sons in a family should be given more encouragement to go to college than daughters.

____ 15. It is ridiculous for a woman to run a locomotive and for a man to darn socks.

____ 16. In general, the father should have greater authority than the mother in the bringing up of children.

____ 17. Women should be encouraged not to become sexually intimate with anyone before marriage, even their fiancés.

____ 18. The law should not favor the husband over the wife in the disposal of family property or income.

____ 19. Women should be concerned with their duties of childbearing and house tending, rather than with desires for professional and business careers.

____ 20. The intellectual leadership of a community should be largely in the hands of men.

____ 21. Economic and social freedom are worth far more to women than acceptance of the ideal of femininity that has been set up by men.

____ 22. On the average, women should be regarded as being less capable of contributing to economic production than are men.

____ 23. There are many jobs in which men should be given preference over women in being hired or promoted.

____ 24. Women should be given equal opportunity with men for apprenticeship in the various trades.

____ 25. The modern girl is entitled to the same freedom from regulation and control that is given to the modern boy.

Now enter a score for each item as follows:

Items 1, 4, 5, 10, 13, 14, 15, 16, 17, 19, 20, 22, and 23:
A = 0 B = 1 C = 2 D = 3
Items 2, 3, 6, 7, 8, 9, 11, 12, 18, 21, 24, and 25:
A = 3 B = 2 C = 1 D = 0

Finally, obtain your score on the scale by adding the scores from the two sets of items listed above. The higher this number, the more nontraditional are your views.

Summary and Review of Key Points

Intelligence: Its Nature and Measurement

Key Terms:

individual differences, p. 416
intelligence, p. 416
triarchic theory, p. 418
componential intelligence, p. 418
experiential intelligence, p. 418
contextual intelligence, p. 418
Stanford-Binet test, p. 421
IQ, p. 421
reliability, p. 424
split-half reliability, p. 425
test-retest reliability, p. 425
validity, p. 425
content validity, p. 425
criterion-related validity, p. 425
predictive validity, p. 426
concurrent validity, p. 426
construct validity, p. 426
cultural bias, p. 427
Raven Progressive Matrices, p. 429
mental retardation, p. 430
Down syndrome, p. 430

- Psychologists generally agree that intelligence involves the ability to think abstractly and to learn from experience.
- In the past, psychologists disagreed over whether intelligence was unitary or multifaceted in nature; today, most believe that intelligence involves both a general capacity to solve many types of problems and several specific abilities.
- In recent years, many researchers have adopted an information-processing approach to intelligence. Sternberg's triarchic theory of intelligence is one example of this newer approach. Additional research indicates that persons scoring high on intelligence tests show signs of faster rates of neural conduction and greater metabolic efficiency in their brains than persons scoring lower on such tests.
- The first individual test of intelligence was devised by Binet and Simon. This test yielded an IQ score, obtained by dividing children's mental age by their chronological age. Revised repeatedly over the years, this test continues in widespread use as the Stanford-Binet test. Because intelligence can be demonstrated nonverbally as well as verbally, other widely used tests of intelligence, such as the Wechsler scales, obtain both a Performance and a Verbal IQ. Group tests of intelligence are highly efficient, but serious questions have been raised about their use with minority groups.
- In order to be useful, any psychological test must have high reliability: it must yield very similar scores when applied more than once to the same quantity. Reliability can be measured in terms of internal consistency—the extent to which all items on the test measure the same characteristic; and through test-retest reliability—the extent to which scores on a test are stable over time.
- In order to be useful, psychological tests must also be high in validity—the capacity to measure what they claim to measure. Types of validity include content validity, criterion-related validity, and construct validity.
- In the United States and elsewhere, members of several minority groups score lower on standard intelligence tests than whites of European descent. This appears to be due at least in part to the cultural bias of these tests. Efforts to construct culture-fair tests of intelligence have been only partly successful.

Human Intelligence: The Role of Heredity and the Role of Environment

Key Term:

confluence theory, p. 436

- Evidence suggests that heredity plays an important role in human intelligence. The IQs of adopted children correlate more closely with those of their biological parents than with those of their adoptive parents. Indentical twins separated early in life often show striking similarities in intelligence and personality as adults.
- Other evidence points to the importance of environmental factors; programs designed to provide children with intellectually enriched environments, such as Head Start, have succeeded in raising IQ scores and academic achievement.
- Within a family, children born earlier tend to have higher IQs than those born late; for instance, first-borns tend to have higher IQs than second-borns. This effect may stem from advantages gained living with only adults rather than with both adults and older siblings.

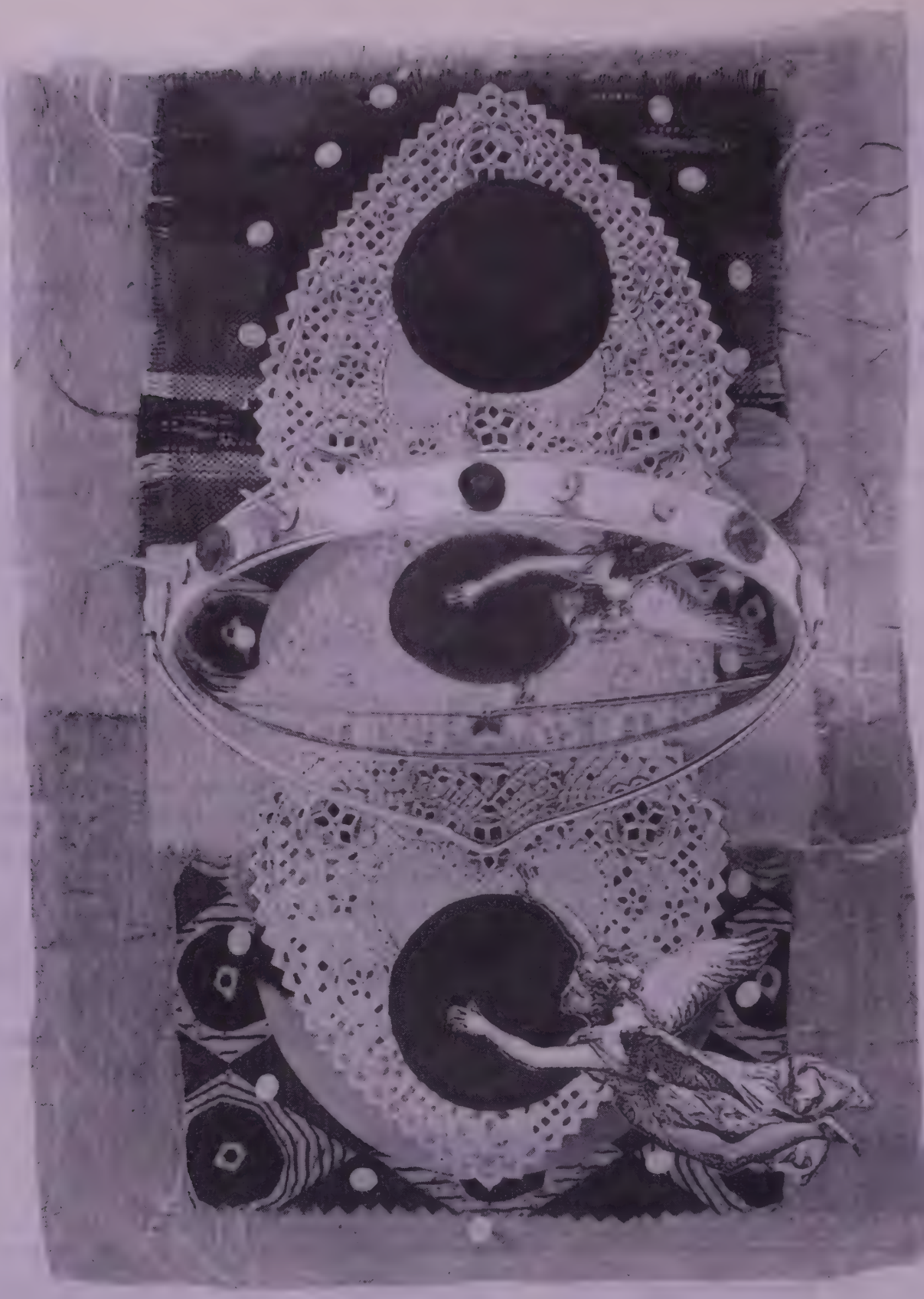
Gender: How Males and Females Differ

Key Terms:

gender, p. 438
parental investment model, p. 444
matching hypothesis, p. 445
mathematics anxiety, p. 449
androgynous, p. 450

- The term *gender* refers to more than biological sex; it includes references to gender stereotypes and gender roles.
- Females are better than males at both sending and reading various nonverbal cues. However, they experience greater social pressure to express positive emotions towards others.
- There are no overall differences between males and females with respect to susceptibility to social influence, but females are often influenced to a greater extent than males by evaluative feedback about their performance.
- Female and male leaders do not appear to differ greatly in terms of style or performance. Yet female leaders often receive lower evaluations than male leaders.
- Males engage in acts of direct physical aggression more often than females. However, females engage in more acts of indirect aggression.
- Females and males differ to some extent in the characteristics they seek in potential mates. Females often seek high status, ambition and intelligence in romantic partners, while males tend to emphasize youth and physical attractiveness. Both parental investment theory and social exchange theory help to explain these differences.
- Females and males differ to some extent with respect to their sexual attitudes and sexual behavior. Males are more accepting of casual sexual encounters and express more permissive attitudes toward extramarital sex. Males report a higher incidence of masturbation, a greater incidence of intercourse, and more partners.
- Females are more likely than males to suffer from depression and eating disorders. In addition, they experience higher levels of math anxiety. With the exception of males who are high in femininity, androgynous persons show better adjustment than those who are traditionally sex-typed.
- Strong evidence indicates that contrasting socialization practices for girls and for boys plus gender stereotypes and gender roles are largely responsible for most gender differences. However, some evidence indicates that biological factors play some role.

Appraisal	Human beings differ in an almost limitless number of ways. Do you agree that differences relating to gender and intelligence are among the most important? If so, why? If not, why?
Controversy	Suppose that at some future time, highly reliable measures of intelligence based on physiological functioning are developed. Do you think that such measures should replace standard tests of intelligence? What advantages would they offer? Would such measures be entirely culture-free, or can you think of subtle ways in which cultural differences might influence performance on even *these* tests?
Making Psychology Part of Your Life	Now that you understand some of the basic requirements of all psychological tests, do you think you will be more skeptical of the kinds of questionnaires that are published in many magazines and claim to measure various psychological traits? I hope so! Why should you approach such quizzes with caution? Under what circumstances could you view them as useful or informative?



Individual Differences II:

Personality—Consistency in the Behavior of Individuals

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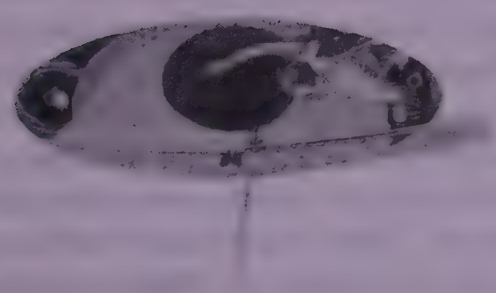
12

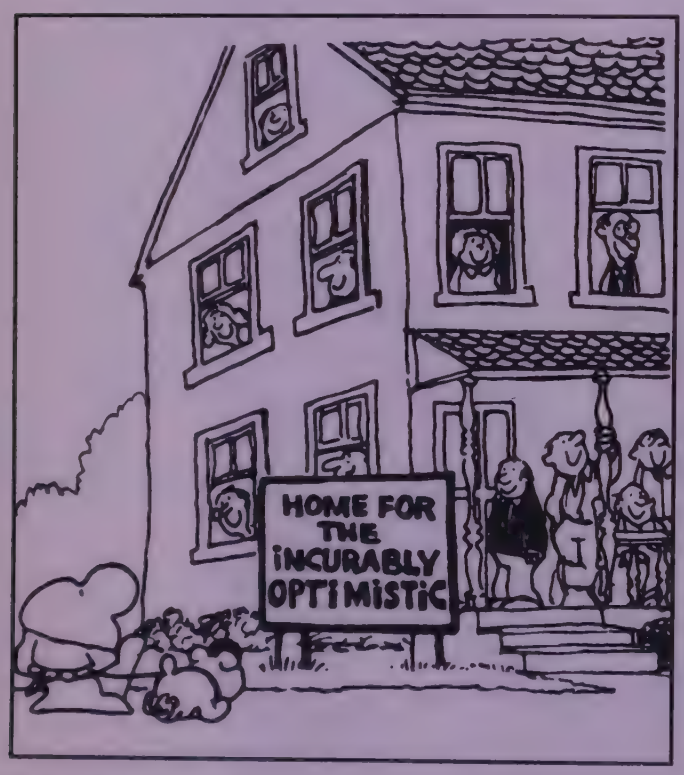


According to one old saying, "Variety is the spice of life." Whether that's true or not, there's certainly no doubt that the people around us provide us with plenty of variety: They differ tremendously in their behavior, their preferences, their outlook on life, and their emotional volatility, and in a thousand and one other ways too. We have already considered several important aspects of such individual differences in chapter 11. Here, we'll continue our exploration of this important topic by focusing on another key aspect of individual differences: *personality.*

Personality can be defined as an individual's unique and relatively stable patterns of behavior, thoughts, and emotions (Burger, 1990; Carver & Scheier, 1992; Wallace, 1993). In daily life, we generally act as though personality is a fact. We expect others to demonstrate consistency in their behavior across different situations and over long periods of time. Once we conclude that a person possesses certain traits—that he or she is, for example, *friendly, sloppy,* and *generous,* we expect that person to behave in ways consistent with these traits in many situations. This raises an intriguing question: Does such consistency really exist? Some psychologists have argued that it does not—that behavior is largely determined by external factors rather than by stable traits or dispositions (Mischel, 1977, 1985). According to these critics of the concept of personality, individuals actually behave very differently in different situations; our perception that they act consistently across situations and over time is largely an error stemming from our desire to simplify the task of predicting their actions (Kunda & Nisbett, 1986; Reeder, Fletcher, & Furman, 1989.)

WE EXPECT OTHERS TO DEMONSTRATE CONSISTENCY IN THEIR BEHAVIOR ACROSS DIFFERENT SITUATIONS AND OVER LONG PERIODS OF TIME.

While these arguments are intriguing ones, the weight of existing evidence suggests that personality, defined in terms of stable behavior tendencies, is indeed real. Long-term studies of individual behavior indicate that people *do* show a fair amount of consistency with respect to many aspects of behavior (e.g., Woodall & Matthews, 1993). In other words, if someone tends to be friendly, sloppy, and generous today, the chances are quite good that that individual will also be friendly, sloppy, and generous tomorrow, next month, next year, or even ten years from today. Indeed, several recent investigations indicate that measures of personality gathered with children are often good predictors of their behavior as adults forty or even fifty years later (e.g., Friedman et al., 1993).



PERSONALITY: CONSISTENCY IN THE BEHAVIOR OF INDIVIDUALS

We generally assume that people show consistency in at least some aspects of their behavior across time and in a wide range of contexts.

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Personality: *Individuals' unique and relatively stable patterns of behavior, thoughts, and feelings.*

It's important to be aware, however, that such consistency over long periods of time does *not* exist for all traits and for all persons (Baumeister & Tice, 1988; Tice, 1989). In fact, the extent to which people show such consistency across time and situations may itself be an important aspect of personality (Koestner, Bernieri, & Zuckerman, 1992). Also, the existence of stable traits in no way implies that situational factors are *not* important determinants of behavior. On the contrary, most psychologists now agree that *both* traits and situations are important. In other words, behavior in a given context is often a function of both internal, dispositional factors—factors people bring with them to that situation—*and* external ones. Further, there are many instances in which situational factors overwhelm dispositions or strongly influence their expression. For instance, even people with wild tempers tend to behave politely when stopped for speeding by a state trooper. So, behavior is generally influenced both by situational factors and by internal ones; and among the internal factors, the stable tendencies included in the concept of personality appear to be quite important.

In the remainder of this chapter, then, we'll assume that personality does indeed exist and can exert important effects on behavior. But what, precisely, is the nature of personality? How do individual differences in it arise? And which personal dispositions or traits are the most important? In order to provide you with an overview of psychology's insights concerning these issues, I'll proceed as follows.

First, I'll survey several *theories of* personality—theoretical frameworks, many of them grand and sweeping in nature, designed to explain the origins

and nature of personality. Few of these frameworks are currently accepted as accurate, but as a group they *have* called attention to important issues and so are worthy of our attention. For each theory, I'll first describe it, then present some research evidence relating to it, and finally offer an evaluation of its current status in psychology. After examining these theories, we'll focus on the nature and impact of several specific *personality traits*—key dimensions along which individuals differ in consistent, stable ways (Wallace, 1993).

KEY POINTS

- Personality consists of the unique and stable patterns of behavior, thoughts, and emotions shown by individuals.
- Behavior is influenced by both situational factors and personal dispositions. Such dispositions do appear to be relatively stable over time and across situations.

THE PSYCHOANALYTIC APPROACH: MESSAGES FROM THE UNCONSCIOUS

When asked to name the three people who have exerted the greatest influence on intellectual developments during the twentieth century, many historians reply without hesitation: Albert Einstein, Karl Marx, and Sigmund Freud. So, by this measure, a psychologist—or at least someone who operated as a psychologist for much of his career—is one of the key figures of modern history. Why is Freud credited with having such an important effect on our intellectual heritage? Much of the answer lies in his influential theories, which focus on personality and other important topics, such as the roots of psychological disorders. Before turning to his theories, however, it seems appropriate to spend a moment or two on Freud's background—*his* personality, if you will.

FREUD THE PERSON: *A Capsule Memoir*

Freud was born in what is now part of the Czech Republic, but when he was four years old, his family moved to Vienna, and he spent almost his entire life in that city. As a young man, Freud was highly ambitious and decided to make a name for himself as a medical researcher. He became discouraged with his prospects in this respect, however, and soon after receiving his medical degree he entered private practice. It was during this period that he formulated his theories of human personality and psychological disorders.

Freud's mother was his father's second wife, and she was much younger than her husband. In fact, she was only twenty-one when Freud was born. Although she had several other children, Sigmund was the first and always his mother's favorite. Among the Freud children only Sigmund had his own room, and when his sister's piano practice disturbed his study, her lessons were stopped and the piano sold. Freud's relationship with his father, in contrast, was cold and distant. Indeed, he even arrived late at his father's funeral and missed most of the service. At the age of twenty-six Freud married Martha Bernays. The marriage was a happy one and produced six children. Freud had a powerful personality, and as he developed his controversial theories, he attracted numerous followers. In many cases these people began as ardent supporters but then came to question some aspects of his work. Freud was intolerant of such criticism, and this often led to angry breaks with once-cherished students. One disciple, however, never broke with his views: his daughter Anna, who became a famous psychoanalyst in her own right.

Freud loved antiques and collected them throughout his life. His collection filled the walls and shelves of his office—even the top of his desk. Each morning the first thing he did was to reach over and affectionately pat one or more of his stone sculptures. Freud recognized a connection between his hobby and his work: He told many of his patients that his search for hidden memories in their unconscious minds was similar to the excavation of a buried ancient city. Freud smoked heavily (he is often shown with a large cigar in his hand), and he contracted oral cancer. This caused him great pain, and starting in 1923 he underwent numerous operations for his disease. Ultimately these interfered with his speech and ended his career as a public speaker.

Like many people of Jewish descent, Freud found it necessary to flee the Nazis, and in 1938 he left Vienna for England. He died there of throat cancer the next year. Many biographies of Freud have been written, and several draw connections between his theories and his personal life experiences—for example, his close relationship with his mother and distant relationship with his father. Whether such links actually exist remains open to debate. What *is* certain, however, is that this complex, brilliant, and dominating man changed Western ideas about human behavior and personality in a lasting way.

Freud's Theory of Personality

As noted earlier, Freud entered private practice soon after obtaining his medical degree. A turning point in his early career came when he won a research grant to travel to Paris in order to observe the work of Jean-Martin Charcot, who was then using hypnosis to treat several types of mental disorders. When Freud returned to Vienna, he worked with Joseph Breuer, a colleague who was using hypnosis in the treatment of *hysteria*—a condition in which individuals experienced physical symptoms, such as blindness, deafness, or paralysis of arms or legs, for which there seemed to be no underlying physical cause. Out of these experiences, and out of his growing clinical practice, Freud gradually developed his theories of human personality and mental illness. His ideas were complex and touched on many different issues. With respect to personality, however, four topics are most central: levels of consciousness, the structure of personality, anxiety and defense mechanisms, and psychosexual stages of development.

Sigmund Freud

Freud is clearly a major figure in the history of psychology. His theories of personality had a profound effect on intellectual thought for many decades.

Levels of Consciousness: Beneath the Iceberg's Tip Freud viewed himself as a scientist, and he was well aware of research on thresholds for sensory experience (refer to chapter 3). Freud applied some of these ideas to the task of understanding the human mind, and reached the startling conclusion that most of the mind lies below the surface—below the threshold of conscious experience. Above this threshold is the realm of the *conscious.* This includes our current thoughts: whatever we are thinking about or experiencing at a given moment. Beneath the conscious realm is the much larger *preconscious.* This contains memories that are not part of current thoughts but can readily be brought to mind if the need arises. Finally, beneath the preconscious, and forming the bulk of the human mind, is the *unconscious:* thoughts, desires, and impulses of which we remain largely unaware (see Figure 12.1). Although some of this material has always been unconscious, Freud believed, much of it was once conscious but has been actively *repressed*—driven from consciousness because it was too anxiety-provoking. For example,

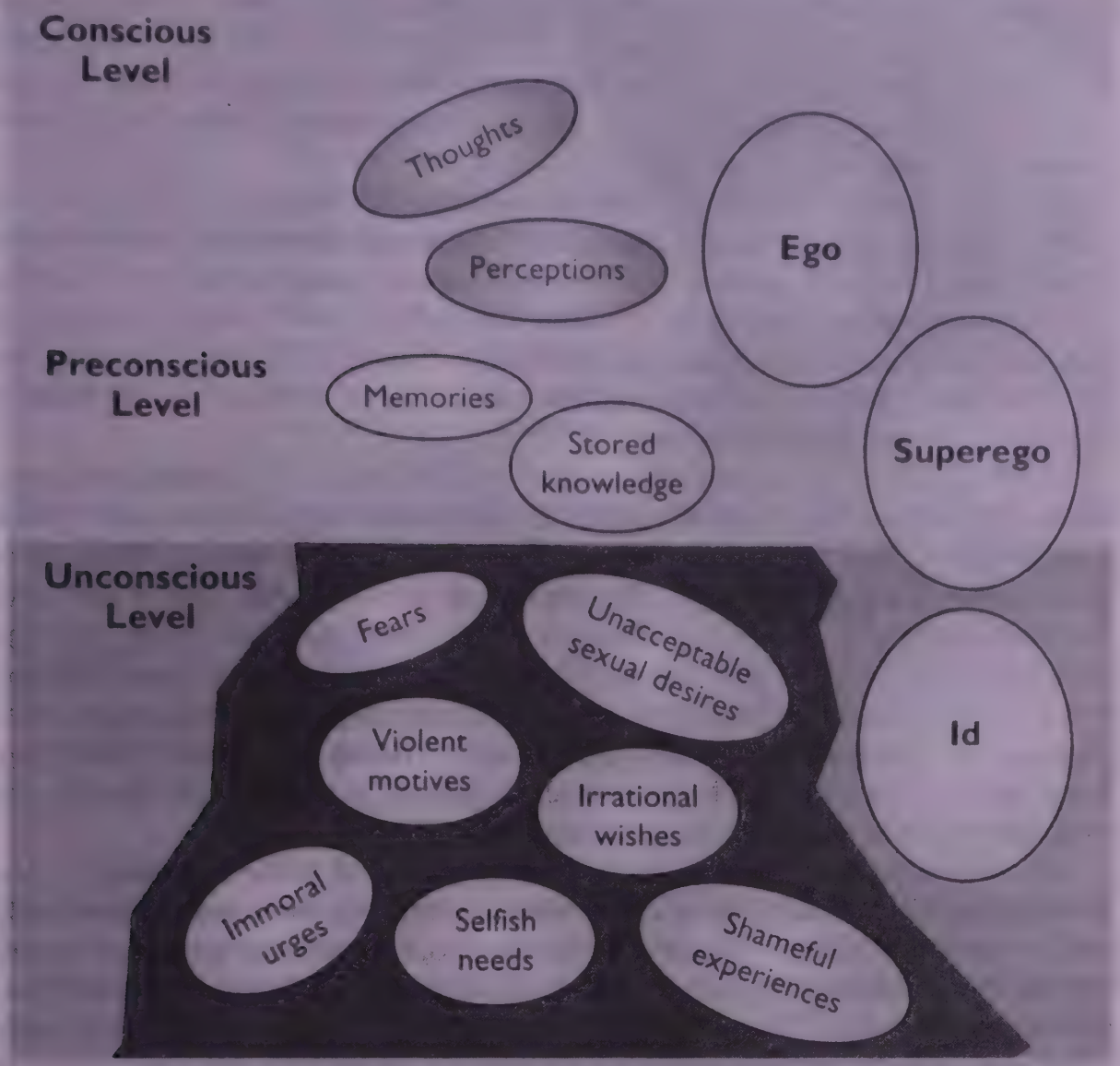


FIGURE 12.1

Freud's Views about Levels of Consciousness and Structures of Personality

Freud believed that the human mind has three distinct levels of consciousness: the *unconscious*, the *preconscious*, and the *conscious*. He also believed that personality involves three important structures: *ego*, *superego*, and *id*, which serve different but related functions and operate at different levels of consciousness.

Aspect of Personality	Level of Consciousness	Description/Function
Ego	Mostly conscious	Mediates between id impulses and superego inhibitions; reality principle; rational
Superego	All levels, but mostly preconscious	Ideals and morals; conscience; incorporated from parents
Id	Unconscious	Basic impulses (sex and aggression); pleasure principle; seeks immediate gratification; irrational, impulsive

according to Freud, shameful experiences or unacceptable sexual or aggressive urges are often driven deep within the unconscious. The fact that we are not aware of the unconscious, however, in no way prevents it from affecting our behavior. Indeed, Freud believed that many of the symptoms experienced by his patients were disguised and indirect reflections of repressed thoughts and desires. This is why one major goal of **psychoanalysis**—the method of treating psychological disorders devised by Freud—is to bring repressed material back into consciousness. Presumably, once this material is made conscious, it can be dealt with more effectively, and important causes of mental illness may be eliminated.

***Psychoanalysis:** A method of therapy based on Freud's theory of personality, in which the therapist attempts to bring repressed unconscious material into consciousness.*

The Structure of Personality: Id, Ego, and Superego Do you know the story of Dr. Jekyll and Mr. Hyde? If so you already have a basic idea of some of the key structures of personality described by Freud. He suggested that personality consists largely of three parts: the *id*, the *ego*, and the *superego* (refer to Figure 12.1). As we'll soon see, these correspond, roughly, to *desire*, *reason*, and *conscience*.

The **id**, or desire, consists of all of our primitive, innate urges. These include various bodily needs, sexual desire, and aggressive impulses. According to Freud, the id is totally unconscious and operates in accordance with what he termed the **pleasure principle**: It wants immediate, total gratification and is not capable of considering the potential costs of seeking this goal. In short, the id is the Mr. Hyde of our personality—although, in contrast to this literary character, it is not necessarily evil.

Unfortunately, the world offers few opportunities for instant pleasure. Moreover, attempting to gratify many of our innate urges would soon get us into serious trouble. It is in response to these facts that the second structure of personality, the **ego**, develops. The ego's task is to hold the id in check until conditions appropriate for satisfaction of its impulses exist. Thus, the ego operates in accordance with the **reality principle**: It takes into consideration the external consequences of actions and directs behavior so as to maximize pleasure *and* minimize pain. The ego is partly conscious but not entirely so; thus, some of its actions—for example, its eternal struggle with the id—are outside our conscious knowledge or understanding.

The final aspect of personality described by Freud is the **superego**. It too seeks to control satisfaction of id impulses, permitting their gratification only under certain conditions. In contrast to the ego, though, the superego is concerned with morality: It can tell right from wrong according to the principles of a given society. The superego permits gratification of id impulses only when it is morally correct to do so—not simply when it is safe or feasible, as required by the ego. So, for example, it would be the superego, not the ego, that would prevent a stockbroker from manipulating funds in clients' accounts under conditions where the broker knew that it was possible to get away with such actions.

The superego is acquired from our parents and through experience and represents our internalization of the moral teachings and norms of our society. Unfortunately, such teachings are often quite inflexible and leave little room for gratification of our basic desires: They require us to be good at all times, like Dr. Jekyll. Because of this fact, the ego faces another difficult task: It must mediate between the id and superego, striking a balance between our primitive urges and our learned moral constraints. Freud felt that this constant struggle among id, ego, and superego plays a key role in the development of personality and in the development of many forms of psychological disorder.

Anxiety and Defense Mechanisms: Self-Protection by the Ego In its constant struggle to prevent outbreak of unbridled impulses from the id, the ego faces a difficult task. Yet for most people, most of the time, the ego is capable of performing this crucial function. Sometimes, though, id impulses grow so strong that they threaten to get out of control. For example, consider the case of a middle-aged widow who finds herself strongly attracted to her daughter's boyfriend. She hasn't had a romantic attachment in years, so her sexual desire quickly rises to powerful levels. What happens next? According to Freud, when her ego senses that unacceptable impulses are about to get out of hand, it experiences **anxiety**—unpleasant feelings of nervousness, tension, or worry. These feelings occur because the unacceptable impulses are

Id: *In Freud's theory, the portion of personality concerned with immediate gratification of primitive needs.*

Pleasure Principle: *The principle on which the id operates—immediate pleasure with no attention to possible consequences.*

Ego: *In Freud's theory, the part of personality that takes rational account of external reality in the expression of instinctive sexual and aggressive urges.*

Reality Principle: *The principle on which the ego operates, according to which the external consequences of behavior are considered in the regulation of expression of impulses from the id.*

Superego: *According to Freud, the portion of human personality representing the conscience.*

Anxiety: *In Freudian theory, unpleasant feelings of tension or worry experienced by individuals in reaction to unacceptable wishes or impulses.*

Defense Mechanism	Its Basic Nature	Example
Repression	"Forgetting"—or pushing from consciousness into unconsciousness—unacceptable thoughts or impulses	A woman fails to recognize her attraction to her handsome new son-in-law.
Rationalization	Conjuring up socially acceptable reasons for thoughts or actions based on unacceptable motives	A young woman explains that she ate an entire chocolate cake so that it wouldn't spoil in the summer heat.
Displacement	Redirection of an emotional response from a dangerous object to a safe one	Anger is redirected from one's boss to one's child.
Projection	Transfer to others of unacceptable motives or impulses	A man sexually attracted to a neighbor perceives the neighbor as being sexually attracted to him.
Regression	Responding to a threatening situation in a way appropriate to an earlier age or level of development	A student asks a professor to raise his grade; when she refuses, the student throws a temper tantrum.

Table 12.1

Defense Mechanisms: Reactions to Anxiety

According to Freud, when the ego feels that it may be unable to control impulses from the id, it experiences anxiety. To reduce such feelings, the ego employs various *defense mechanisms*, such as the ones described here.

getting closer and closer to consciousness, as well as closer and closer to the limits of the ego to hold them in check.

At this point, Freud contends, the ego may resort to one of several different **defense mechanisms**. These are all designed to keep unacceptable impulses from the id out of consciousness and so to prevent their open expression. Defense mechanisms take many different forms. For example, in **sublimation**, the unacceptable impulse is channeled into some socially acceptable action. Instead of making love to the young man, as Freud would say she really wants to do, the widow may "adopt" him as a son and provide financial support for furthering his education. Another mechanism, known as **reaction formation**, consists of efforts to hide from a threatening impulse by behaving in a manner directly opposite to the impulse. For example, the widow might convince herself that she intensely dislikes the young man and urge her daughter to stop seeing him. Table 12.1 describes additional defense mechanisms. While they differ greatly in specific form, all serve the function of reducing anxiety by keeping unacceptable urges and impulses from breaking into consciousness.

Defense Mechanisms: *Techniques used by the ego to keep threatening and unacceptable material out of consciousness and so to reduce anxiety.*

Sublimation: *A defense mechanism in which threatening unconscious impulses are channeled into socially acceptable forms of behavior.*

Reaction Formation: *A defense mechanism in which people act in a manner directly opposite to their unconscious wishes.*

Psychosexual Stages of Development: *According to Freud, an innate sequence of stages through which all human beings pass. At each stage, pleasure is focused on a different region of the body.*

Psychosexual Stages of Development Now we come to what is perhaps the most controversial aspect of Freud's theory of personality. Many people find Freud's ideas about levels of consciousness to be quite reasonable: After all, as we saw in chapter 4, we do seem to move through distinct levels of consciousness during the course of a single day. Similarly, many find appealing the idea of distinct aspects of personality reflecting primitive urges, conscience, and the mediation between these forces. When we turn to Freud's ideas about the formation of personality, however, the situation changes radically. Even a hundred years after he proposed them, Freud's views concerning this issue offend some people and seem totally absurd to others. These views can be grouped under the heading **psychosexual stages of development**: innately determined stages of sexual development through which, presumably, we all pass.

FREUD'S ANAL STAGE OF DEVELOPMENT

Freud believed that fixation during the anal stage, resulting from traumatic toilet training experiences, could lead to an excessive need for order and a stubborn personality in adults.

To understand Freud's ideas concerning psychosexual development we must first grasp his concepts of *libido* and *fixation.* According to Freud, the **libido** is the instinctual life force that energizes the id. Release of libido is closely related to pleasure, but the focus of such pleasure—and the expression of libido—changes as we move through discrete stages of development. As we move through these stages, and obtain different kinds of pleasure in them, we leave behind small amounts of our libido. But if an excessive amount of energy is tied to a particular stage, **fixation** is said to result. This can stem from either too little or too much gratification during this stage, and in either case the result is harmful. Since the individual has left too much "psychic energy" behind, less is available for full adult development. The outcome may be an adult personality reflecting the stage or stages at which fixation has occurred. To put it another way, if too much energy is drained away by fixation at earlier stages of development, the amount remaining may be insufficient to power movement to full adult development. Then, an individual may develop an immature personality and so be subject to several important forms of psychological disorder.

Libido: *According to Freud, the psychic energy that powers all mental activity.*

Fixation: *Excessive investment of psychic energy in a particular stage of psychosexual development, which results in various types of psychological disorders.*

Oral Stage: *In Freud's theory, a stage of psychosexual development during which pleasure is centered in the region of the mouth.*

Anal Stage: *In Freud's theory, a psychosexual stage of development in which pleasure is focused primarily on the anal zone.*

Phallic Stage: *In Freud's theory, a psychosexual stage of development during which pleasure is centered in the genital region. It is during this stage that the Oedipus complex develops.*

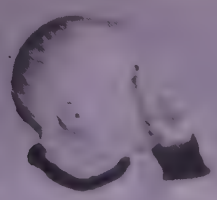
Oedipus Complex: *In Freud's theory, a crisis of psychosexual development in which children must give up their sexual attraction to their opposite-sex parent.*

Now back to the actual stages themselves. According to Freud, as we grow and develop, different parts of the body serve as the focus of the constant quest for pleasure. In the initial **oral stage**, lasting until we are about eighteen months old, we seek pleasure primarily through the mouth. If too much or too little gratification occurs during this stage, an individual may become *fixated* at it. Too little gratification results in a personality that is overly dependent on others; too much, especially after the child has developed some teeth, results in a personality that is excessively hostile, especially through verbal sarcasm and similar "biting" forms of behavior.

The next stage occurs in response to efforts by parents to toilet train their children. During the **anal stage**, the process of elimination becomes the primary focus of pleasure. Fixation at this stage, stemming from traumatic toilet-training experiences, may result in individuals who are excessively orderly and stubborn or, alternatively, excessively generous and undisciplined.

At about age four, the genitals become the primary source of pleasure, and children enter the **phallic stage**. Freud speculated that at this time we fantasize about sexual relations with our opposite-sex parent—a phenomenon he termed the **Oedipus complex**. (The complex is named after Oedipus, a character in ancient Greek literature who unknowingly killed his father and then married his mother. When he discovered the true nature of these monstrous acts, he blinded himself.) Fear of punishment for such desires then enters the picture. Among boys, the feared punishment is castration, leading to *castration anxiety;* among girls, the feared punishment is loss of love. In both cases these fears bring about resolution of the Oedipus complex and identification with the same-sex parent. This, in turn, stimulates development of the superego. Because fear of castration is more vivid and threatening than fear of loss of love, Freud contended that resolution of the Oedipus complex is more complete in boys than girls. Thus, in his theory, the superego is, supposedly, stronger for males than for females.

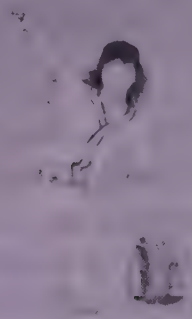
Even more controversial is Freud's suggestion that little girls experience *penis envy*: feelings of envy upon seeing the male organ and realizing that



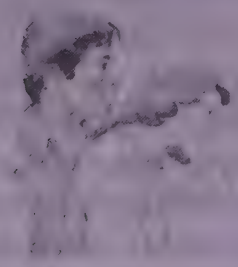
Oral 0–2
Infant achieves gratification through oral activities such as feeding, thumb sucking, and babbling.

Anal 2–3
The child learns to respond to some of the demands of society (such as bowel and bladder control).

Phallic 3–7
The child learns to realize the differences between males and females and becomes aware of sexuality.



Latency 7–11
The child continues his or her development but sexual urges are relatively quiet.



Genital 11–adult
The growing adolescent shakes off old dependencies and learns to deal maturely with the opposite sex.

FIGURE 12.2

Psychosexual Stages of Development: Freud's View

According to Freud, all human beings pass through a series of discrete *psychosexual stages of development*. At each stage, pleasure is focused on a particular part of the body. Too much or too little gratification at any stage can result in *fixation* and can lead to psychological disorders.

they do not possess it. Freud suggested that confronted with this realization, girls experience strong feelings of inferiority and jealousy—feelings they may carry with them in disguised form even in adult life. As you can readily guess, these ideas now are strongly rejected by virtually all psychologists.

After resolution of the Oedipus conflict, children enter the **latency stage**, in which they remain until the onset of puberty. During the latency period, Freud contended, sexual urges are largely repressed. After puberty, individuals enter the final—the **genital stage**. During this stage, pleasure is again focused on the genitals. Now, however, lust is blended with affection, and the person becomes capable of adult love in its fullest meaning. Please remember: progression to the genital stage is possible only if serious fixation has *not* occurred at the earlier stages of development. If such fixation has occurred, then the normal pattern of development is blocked, and various forms of psychological disorder result.

Figure 12.2 summarizes the various stages of psychosexual development that Freud proposed.

Latency Stage: *In Freud's theory, the psychosexual stage of development that follows resolution of the Oedipus complex. During this stage, sexual desires are relatively weak.*

Genital Stage: *In Freud's theory, the final psychosexual stage of development—one in which individuals acquire the adult capacity to combine lust with affection.*

KEY POINTS

- According to Freud, three distinct levels of consciousness exist: conscious, preconscious, and unconscious.
- Freud contended that personality consists of three basic parts: id, ego, and superego. These correspond roughly to desire, reason, and conscience.
- According to Freud, all human beings move through a series of psychosexual stages, during which the search for pleasure is focused on different regions of the body. Too much or too little gratification at any stage can result in fixation and later in psychological disorders.

RESEARCH EVIDENCE CONCERNING FREUD'S THEORY: Freudian Slips

Freud's theory of personality is filled with provocative ideas and suggestions. Moreover, there can be little doubt that it is now part of our general culture. It is equally clear, however, that many of the ideas and concepts introduced by Freud are difficult to assess through empirical research. This is one of the key criticisms of his theory. Yet over the years, many investigators have developed ingenious ways of testing some of Freud's ideas and hypotheses (Deckers & Carr, 1986; Hall, 1984). For example, researchers have attempted to study what have come to be known as **Freudian slips**—occasions on which we say something quite different from our intended meaning. Consider the following examples:

GUEST TO HOSTESS: The food is really inedible ...I mean *incredible*!"

SALESPERSON TO CUSTOMER: "You can't get a better deal everywhere...I mean *anywhere*!"

Are these merely slips of the tongue? Perhaps. But according to Freud, these errors may also reflect hidden, unconscious thoughts, which is why they are often known as *Freudian slips.* This intriguing suggestion has been subjected to careful empirical test. For example, in one study on the nature of Freudian slips (Motley & Camden, 1985), male students were asked to complete innocent-sounding sentences. Half performed this task in the presence of a male experimenter and half performed it in the presence of an attractive and seductively clad female experimenter. Results indicated that the participants made more slips of the tongue with a sexual connotation in the presence of the female experimenter. For example, when asked to complete the sentence "With the telescope, the details of the distant landscape were easy to . . . ," they were more likely to say "make out" in the presence of the female. And many of the participants found their words, once uttered, to be embarrassing. At first glance this study seems to support Freud's contention that slips of the tongue are revealing of unconscious motives or desires—although it seems more likely that the desires were quite conscious! However, other interpretations exist. For instance, in the presence of the strong sex-related cues provided by the attractive experimenter, activation of sex-related words may have been stronger than activation of other, more neutral words. Thus, it is not surprising that the sex-related words were selected more frequently by subjects. Unfortunately, similar ambiguity with respect to interpretation is present in many other studies designed to test various aspects of Freud's theory (e.g., Dworkin & Efran, 1967; Zillmann, 1988).

FREUD'S THEORY: An Overall Evaluation

As noted earlier, Freud's place in history seems assured: His ideas and writings have exerted a profound impact on twentieth-century intellectual trends. But what about his theory of personality? Is it currently accepted by most psychologists? As you can probably guess from my earlier comments, the answer is *definitely not*. The reasons for this rejection, too, are clear. First, many critics have noted that Freud's theory is really not a theory at all, at least in the scientific sense of this term. Several of the concepts it contains cannot be measured, even indirectly. How, for example, does one go about observing an *id*, a *fixa-*

Freudian Slips: *Statements that seem to be simple errors in speech, but which in fact reveal unconscious thoughts or impulses.*

tion, or the psychic energy contained in the *libido*? Similarly, the theory offers few if any testable hypotheses about human behavior. As you will recall from chapter 1, a theory that cannot be tested is largely useless.

Second, as we have already seen, several of Freud's proposals are not consistent with the findings of modern research. For example, he believed that dreams reflect unconscious urges and desires. As chapter 4 explained, there is little evidence for this view.

Third, in constructing his theory, Freud relied heavily on a small number of case studies—no more than a dozen at most. Almost all of these individuals came from wealthy backgrounds and lived in a large and sophisticated city in a single culture. Thus, they were hardly representative of human beings generally. (See the **Perspectives on Diversity** section below for more information on this point.) Moreover, Freud indicated that he accepted for study and treatment only persons he viewed as particularly good candidates for successful therapy, and he himself recorded and later analyzed all of the information about these cases. Thus, there were many opportunities for unconscious forms of bias to enter the process through which he constructed his theories.

Finally, and perhaps most important of all, Freud's theories contain so many different concepts that they can explain virtually any pattern of behavior in an after-the-fact manner. Imagine, for example, that someone suffering from an "anal" personality is very messy rather than neat, as the theory would initially predict. Freudian psychoanalytic theory is not at a loss: It might suggest that the person's messiness is a defense reaction against anxiety stemming from the need to be neat. In short, no matter what pattern of behavior is demonstrated, Freudian concepts can "explain" them. As you can see, this fact leaves little room for disconfirmation, and thus for testing the theory adequately.

For these and other reasons, Freud's theory of personality is not currently accepted by most psychologists. Yet I should add that several of Freud's insights—especially his ideas about levels of consciousness and the importance of anxiety in various psychological disorders—*have* contributed to our understanding of human behavior in general and personality in particular. There can be no doubt that he has had a major and lasting impact on psychology.

Perspectives on Diversity

Love and Intimacy in Different Cultures

According to Freud, all human beings pass through a fixed series of stages with respect to sexuality—stages of *psychosexual development*. If this is true, then we might expect human beings all over the world, even in sharply divergent cultures, to express love and intimacy in similar ways. This would be so because if Freud's theory is correct, all human beings would move through the same stages of development and ultimately attain the same final stage.

In fact, however, this is definitely not the case. On the contrary, ideas about love and intimacy and the overt forms these take vary greatly from culture to culture. For example, in one study on this topic, Simmons, vom Kolke, and Shimizu (1986) compared attitudes about love among Japanese, German, and American college students. Important differences emerged. Japanese students rated romantic love as being less important to personal and marital happiness than did their German and American counterparts. Further, Japanese described the state of being in love in more negative terms—as a dazed condition filled with feelings of jealousy. American and German students, however, described being in love in comparatively positive terms. Finally, Japanese students expected marriage to

LOVE IN DIFFERENT CULTURES

Research suggests that love and intimacy are expressed in sharply different ways in various cultures. These findings appear to contradict Freud's belief that all human beings pass through the same stages of psychosexual development.

result in disillusionment, while American and German students were more optimistic about the possibility of long-lasting romantic relationships.

With respect to the expression of intimacy, important cultural differences also emerge. According to Ting-Toomey (1991), a researcher who has studied many cultural differences, individuals learn to express intimacy toward a romantic partner in ways viewed as acceptable by their society. For example, Ting-Toomey predicted that societies differing along the cultural dimension of *individualism-collectivism* would also differ with respect to the expression of intimacy in love relationships. The individualism-collectivism dimension (Hofstede, 1980) refers to the extent to which a society focuses on the individual or, instead, on the family and other groups. The United States is generally described as a highly individualistic culture, while Japan is described as a collectivist culture. France falls in between these two on the individualism-collectivism dimension.

To see if persons in these cultures do indeed express intimacy differently, Ting-Toomey (1991) surveyed university students in all three countries, asking them to answer questions concerning perceived interdependence, communication about the relationship, and conflict (overt arguments and disagreements). She predicted that all types of intimacy expression would be greater in individualistic than in collectivistic societies. The findings of the study confirmed her predictions: Students in the United States reported higher feelings of interdependence, communication with their romantic partner, and conflict than students in France; those in Japan reported the lowest levels on all measures.

Together, these findings and those of related research suggest that there are indeed important cultural differences both in ideas about love and intimacy and in their overt expression. To the extent such differences exist, any theory that assumes that all human beings move through an identical series of psychosexual stages—such as Freud's—must be called into question. In short, where the study of personality is concerned, wearing cultural blinders can severely limit our understanding of important aspects of human behavior.

OTHER PSYCHOANALYTIC VIEWS: Freud's Disciples . . . and Dissenters

Whatever else Freud was, he was certainly an intellectual magnet. Over the course of several decades, he attracted as students or colleagues many brilliant and creative people. Most of these scholars began by accepting Freud's views. Later, however, they often disagreed with some of his major assump-

tions. For example, while many of these **neo-Freudians** accepted the importance of the unconscious, they objected to Freud's contention that personality is fully formed during the first years of life and to his emphasis on instinctual rather than social influences on personality. As I mentioned earlier, these disagreements sometimes led to angry breaks between Freud and his followers; the master, it seems, was unwilling to accept even slight deviations from what he defined as the only true path to greater knowledge. Let's consider some of the intriguing views proposed by these one-time protégés of Freud.

Jung: The Collective Unconscious

Perhaps the most bitter of all the defections from Freud's inner circle was the departure of Carl Jung. Freud viewed Jung as his heir apparent and was deeply upset when his former disciple broke with him. Jung shared Freud's views concerning the importance of the unconscious. Jung contended, however, that there is another part to this aspect of personality that Freud overlooked: the **collective unconscious**. According to Jung, the material in the collective unconscious is shared by all human beings and is part of our biological heritage. Of what does the collective unconscious consist? For one thing, **archetypes**—images that predispose us to perceive the external world in certain ways. Included among the archetypes we all share, Jung maintained, are these: *mother, father, wise old man, the sun, the moon, God, death,* and *the hero*. It is because of these shared innate images, Jung contended, that the folklore of many different cultures often contains similar figures and themes.

Two especially important archetypes in Jung's theory are known as the **animus** and the **anima**. The animus is the masculine side of females, while the anima is the feminine side of males. Jung believed that in looking for a mate, we search for the person onto whom we can best project these hidden sides of our personality. When there is a good match between such projections and another person, attraction occurs.

Another aspect of Jung's theory was his suggestion that we are all born with innate tendencies to be concerned primarily either with ourselves or with the outside world. Jung labeled persons in the first category **introverts** and described them as being hesitant and cautious; they do not make friends easily and prefer to observe the world rather than become involved in its many activities. He labeled persons in the second category **extroverts**. Such persons are open and confident, make friends readily, enjoy high levels of stimulation, and take part in a wide range of activities. While many aspects of Jung's theory have been rejected by psychologists, the dimension of *introversion-extroversion* appears to be a basic one and continues to be the subject of a considerable amount of research (Eysenck & Eysenck, 1985).

Neo-Freudians: *Personality theorists who accepted basic portions of Freud's theory but rejected or modified other portions.*

Collective Unconscious: *In Jung's theory, a portion of the unconscious shared by all human beings.*

Archetypes: *According to Jung, inherited images in the collective unconscious that shape our perceptions of the external world.*

Animus: *According to Jung, the archetype representing the masculine side of females.*

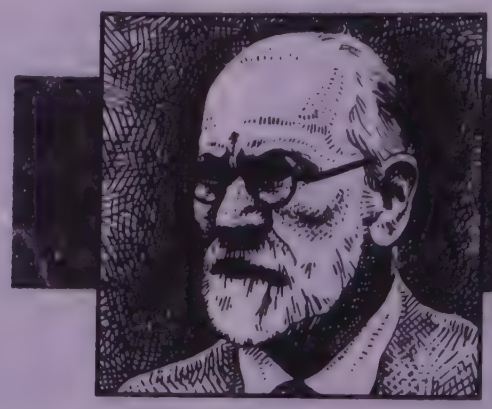
Anima: *According to Jung, the archetype representing the feminine side of males.*

Introverts: *Individuals who are quiet, cautious, and reclusive, and who generally inhibit expression of their impulses and feelings.*

Extroverts: *Individuals who are talkative and sociable, and who often give free rein to their impulses and feelings.*

Archetypes: A Key Concept in Jung's Theory of Personality

According to Jung, all human beings possess *archetypes*—shared images of figures such as heros. What other archetypes can you think of?



Sigmund Freud (1856–1939)

For many, Freud is the best known figure in psychology. His theory of personality focuses on three major concepts: id, ego, and superego. Freud believed that psychological problems result from early life experiences. His psychoanalytic approach to therapy is still used today, mainly by psychiatrists.

Carl Jung (1875–1961)

Jung is best known for his theories about the *collective unconscious,* accumulated awareness of the experience of past generations and civilizations.

Horney: The Importance of Social and Cultural Factors

Why do men and women differ to some extent in some aspects of behavior? Almost all modern psychologists would answer: largely because of contrasting experiences during childhood, exposure to different kinds of social models, and so on. Freud, as you already know, held a sharply different view. In many of his writings, he attributed behavioral differences between men and women to innate factors—for example, anatomical differences between the sexes and the resulting *penis envy* he believed all females experience.

Karen Horney, one of the few females in the early psychoanalytic movement, disagreed strongly. She contended that differences between males and females were largely the result of social factors, *not* innate inferiority on the part of females. In fact, Horney (1967) countered Freud's concept of penis envy with one of her own: *womb envy*—males' envy of women's ability to bear and nurse children! Her point was not that males are inferior to females. Rather, she wished to emphasize the fact that each sex has attributes admired by the other and that neither should be viewed as superior *or* inferior.

While well-reasoned objections to some of Freud's negative ideas about women constitute an important contribution, Horney focused on other issues, too. She emphasized that psychological disorders stem not from the fixation of psychic energy, as Freud saw it, but from disturbed interpersonal

Karen D. Horney (1885–1952)

Horney was trained in Freudian psychoanalysis at the Berlin Psychological Institute. Highly critical of Freud's theory and his ideas about female sexuality, Horney split from strict Freudian ideas. She emphasized social and environmental conditions in the development of personality.

Alfred Adler (1870–1937)

Adler disagreed with many of Freud's basic beliefs, especially the idea that sexual impulses are the source of personality development. Adler maintained that we are driven by the need to compensate for feelings of inferiority and to strive for superiority in our lives.

relationships during childhood. In particular, Horney contended that parents often generate feelings of isolation and helplessness in their children—feelings that interfere with healthy development. Unfortunately, parents can produce such outcomes in many ways—by being too dominant, by showing indifference, by providing too much approval and admiration or too little. When such conditions exist, individuals do not develop adequately and may adopt ineffective styles of interacting with others.

Horney described one of these styles as *moving toward people*. This pattern involves compulsively seeking affection and acceptance from others. Persons who show it need desperately to be liked and loved but are often unable to return true affection to those who fill these needs. Another pattern is termed *moving against people*. Individuals who show this pattern assume that others are hostile and that it is appropriate to manipulate and take advantage of them. A third pattern, *moving away from people*, centers on striving for independence and privacy. Persons who show this pattern form few friendships and prefer privacy and isolation to social contacts. To summarize, persons with the three patterns seem to go through life asking, respectively, these questions: "Will he/she like me?" "Can he/she be useful to me?" "Will he/she interfere with me or leave me alone?" All of these patterns are ineffective and lead to considerable unhappiness. Only if people can overcome them through appropriate therapy can they recover from the damage produced by their early experiences with disturbed interpersonal relations.

Adler: Striving for Superiority

Do the views of personality theorists reflect their own life experiences? I raised this possibility when I described Freud's early life. If there is a theorist for whom these potential links seem even stronger, however, it is Alfred Adler. Like Freud, Adler lived in or near Vienna. But unlike Freud, he was a pampered and sickly child. He suffered from a series of childhood illnesses that made him feel weak and awkward, especially in comparison with his strong and healthy older brother. Indeed, Adler recalled an incident in which a physician informed his father: "Your boy is lost." (He was suffering from pneumonia at the time.) In later childhood Adler worked very hard to overcome his physical disabilities. Ultimately, he was so successful in doing so that he rose to leadership among his friends.

These early experiences had a profound impact on Adler and led him to formulate a theory in which feelings of inferiority play a central role. According to Adler's theory, we are motivated by feelings of inferiority, which stem initially from our small size and physical weakness during early childhood. In reaction to these feelings, we try to overcome them through **striving for superiority**. In other words, we engage in *compensation;* we strive to overcome real or imagined inferiorities by developing our abilities. If we succeed, healthy development may follow. If we overcompensate, however, we may conceal our feelings of inferiority even from ourselves, and so develop a distorted self-image.

Like several other neo-Freudians, Adler emphasized the importance of social factors in personality development. For example, he felt that birth order was an important variable: Only children are spoiled by too much parental attention, while first-borns are "dethroned" by a second child. Second-borns, Adler felt, are often competitive, since they have to struggle to catch up with an older sibling. The *family constellation*—our early perceptions of the dynamics within our family—is important, too. Later, we develop a distinctive *style of life*, in which our emotions, thoughts, and actions are directed toward the achievement of life goals we have formulated out of our strivings to overcome feelings of inferiority. In sum, in contrast to Freud, Adler believed that personality development is driven by forces other than the quest for pleasure, and that an understanding of adult personality must be focused on these diverse factors.

Key Points

- Jung believed that all human beings share a collective unconscious: shared memories and images that strongly shape our perceptions of the world and our behavior.
- Horney rejected Freud's suggestion that females experience penis envy, and she contended that many psychological disorders stem largely from social factors rather than from fixation.
- Adler believed that human beings experience strong feelings of inferiority during early life. They strive to overcome these through compensation. Adler also believed that social factors play an important role in shaping adult personality.

Striving for Superiority: *Attempting to overcome feelings of inferiority. According to Adler, this is the primary motive for human behavior.*

The Neo-Freudians: An Evaluation

Several neo-Freudians paid a high price for their objections to features of Freud's theory: They were literally drummed out of the group for daring to dissent. Was this high personal cost justified by the magnitude of their contributions? Some modern psychologists would answer yes.

The theories proposed by the neo-Freudians are subject to some of the same criticisms applied to Freud's views. For example, they are *not* based on the kind of hard data science requires; they are difficult if not impossible to test through actual research. And since these theories were often derived from case studies from the neo-Freudians' own clinical practice, they are subject to the same potential types of bias as Freud's original theories.

But—and this is an important point—the theories proposed by some neo-Freudians have served as a kind of bridge between the psychoanalytic

approach and later, modern theories of personality. In particular, two of the neo-Freudians' ideas—that the ego is the most important aspect of personality and that human relationships are a key part of life and strongly affect personality—are similar to views proposed by *humanistic theorists*, a group to which we turn next. Please don't misunderstand: The neo-Freudians did not seek to build bridges to modern psychology. Most were trained in medicine, and they focused their attention on Freud's theories, *not* on the research and thinking of academic psychologists (Carver & Scheier, 1992). However, there was some degree of contact between these two groups of scholars, and it seems possible that the neo-Freudians contributed to the advancement of personality theory. So, in a sense, the intellectual—and sometimes personal—battles waged by the neo-Freudians were not in vain. They never toppled the edifice erected by Freud, but did help connect it to important developments that followed.

Humanistic Theories: Emphasis on Growth

Id versus ego, Jekyll versus Hyde—on the whole, psychoanalytic theories of personality take a dim view of human nature, contending that we must struggle constantly to control our brutish impulses if we are to function as healthy, rational adults. Is this view accurate? Many psychologists think it isn't. They believe that human strivings for growth, dignity, and self-determination are just as strong as, if not stronger than, the more primitive motives Freud emphasized. Several theories of personality, because of their more optimistic views concerning human nature, are known as **humanistic theories** (Maslow, 1970; Rogers, 1977, 1982). These theories differ widely in the concepts they employ and the aspects of personality on which they focus but share the following characteristics.

First, they emphasize *personal responsibility*. Each of us, these theories contend, is largely responsible for what happens to us. Our fate is mostly in our own hands; we are *not* at the mercy of dark forces within our personalities that leave us little choice but to act in certain ways. Second, while these theories don't deny the importance of past experience, they generally focus on the present. True, we may be influenced by traumatic early experiences. Yet these do *not* have to shape our entire adult lives, and the capacity to overcome them and to go on from there is both real and potent. Third, humanistic theories stress the importance of *personal growth*. People are not, such theories argue, content with merely having their current needs met. They wish to continue their development and to progress toward becoming the best they can be. Only when obstacles interfere with such growth is the process interrupted. A key goal of therapy, therefore, should be to help remove obstacles so that natural growth processes can continue. As examples of humanistic theories, we'll now consider the influential views proposed by Carl Rogers and Abraham Maslow.

Rogers's Self Theory: Becoming a Fully Functioning Person

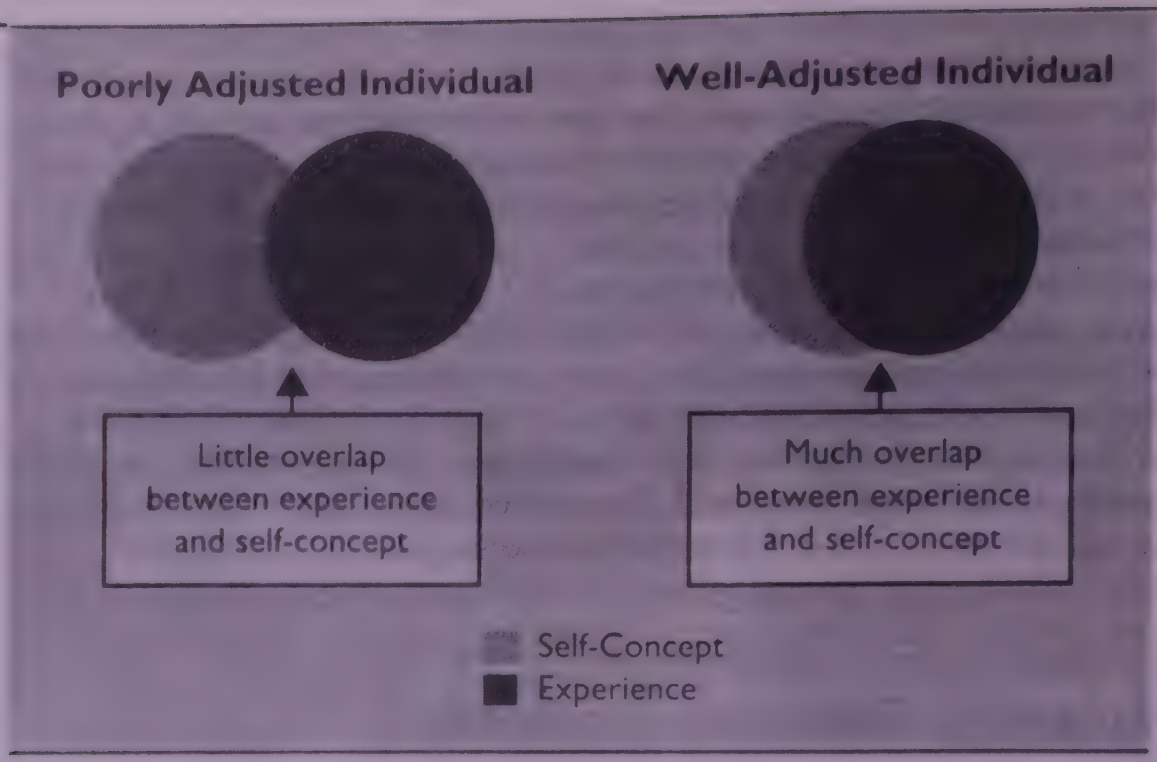
Carl Rogers planned to become a minister, but after exposure to several courses in psychology, he changed his mind. He decided, instead, to focus on efforts to understand the nature of human personality—and why it sometimes goes off the track. The theory Rogers formulated played an important role in the emergence of humanistic psychology and remains influential today.

Humanistic Theories: *Theories of personality emphasizing personal responsibility and innate tendencies toward personal growth.*

FIGURE 12.3

Rogers's View of Adjustment

According to Rogers, the larger the gap between an individual's self-concept and reality, the poorer this person's psychological adjustment.



One central assumption of Rogers's theory was this: Left to their own devices, human beings show many positive characteristics and move, over the course of their lives, toward becoming **fully functioning persons**. What are such persons like? Rogers suggests that they are people who strive to experience life to the fullest, who live in the here and now, and who trust their own feelings. They are sensitive to the needs and rights of others, but do not allow society's standards to shape their feelings or actions to an excessive degree. "If it feels like the right thing to do," such people reason, "then I should do it." Fully functioning people aren't saints; they can—and do—lose their tempers or act in ways they later regret. But throughout life, their actions become increasingly dominated by constructive impulses. They are in close touch with their own values and feelings and experience life more deeply than most other persons.

If all human beings possess the capacity to become fully functioning persons, why don't they all succeed? Why, in short, aren't we surrounded by models of health and happy adjustment? The answer, Rogers contends, lies in the anxiety generated when life experiences are inconsistent with our ideas about ourselves—in short, when a gap develops between our **self-concept** (our belief and knowledge about ourselves) and reality, or our perceptions of it. For example, imagine an individual who believes that she is very likable and that she makes friends easily. One day she happens to overhear a conversation between two other people who describe her as moody, difficult to get along with, and definitely *not* very likable. She is crushed; here is information that is highly inconsistent with her self-concept. As a result of this experience, anxiety occurs, and she adopts one or more psychological defenses to reduce it. The most common of these is *distortion*; for example, the woman convinces herself that the people discussing her do not really know her very well or that they have misinterpreted her behavior. Another defense process is *denial*. Here, the woman may refuse to admit to herself that she heard the conversation or that she understood what the other people were saying.

Fully Functioning Persons: *In Rogers's theory, psychologically healthy persons who enjoy life to the fullest.*

Self-Concept: *All the information and beliefs individuals have about their own characteristics and themselves.*

In the short run, such maneuvers are successful: They help reduce anxiety. Ultimately, however, they produce sizable gaps between an individual's self-concept and reality. The larger such gaps, Rogers contends, the greater an individual's maladjustment—and personal unhappiness (see Figure 12.3). Rogers suggests that distortions in the self-concept are common because most people grow up in an atmosphere of *conditional positive regard*. They learn that

others, such as their parents, will approve of them only when they behave in certain ways and express certain feelings. As a result, many people are forced to deny the existence of various impulses and feelings, and their self-concepts become badly distorted.

How can such distorted self-concepts be repaired—brought more closely into alignment with reality? Rogers suggests that therapists can help accomplish this by placing individuals in an atmosphere of **unconditional positive regard**—a setting in which they realize that they will be accepted by another person *no matter what they say or do*. Such conditions are provided by *client-centered therapy*, a form of therapy developed by Rogers and his colleagues. We'll consider client-centered therapy in detail in chapter 15. Here, I wish simply to note that such therapy does seem to be effective in helping at least some people attain enhanced levels of personal happiness and adjustment.

Maslow and the Study of Self-Actualizing People

Another influential humanistic theory of personality is one proposed by Abraham Maslow (1970). We have already encountered a portion of Maslow's theory, his concept of a *needs hierarchy*, in chapter 10. As you may recall, this concept suggests that human needs exist in a hierarchy, ranging from *physiological needs* on the bottom through *safety needs, belongingness needs, esteem needs*, and finally, *self-actualization needs* at the top. According to Maslow, lower-order needs in the hierarchy must be satisfied before we can turn to more complex, higher-order needs. Thus, our basic biological needs must be at least partially met before we can become concerned about belonging to social networks or enhancing our self-esteem.

The needs hierarchy, however, is only part of Maslow's theory of personality. Maslow has also devoted much attention to the study of people who, in his terms, are *psychologically healthy*. These are individuals who have attained high levels of **self-actualization**—a state in which they have reached their own fullest true potential. What are such people like? In essence, they are very similar to the fully functioning persons described by Rogers. Self-actualized people accept themselves for what they are; they recognize their shortcomings as well as their strengths. Being in touch with their own personalities, they are less conformist or inhibited than most of us. Self-actualized people are well aware of the rules imposed by society but feel greater freedom to ignore them than is typical. Two additional characteristics of self-actualized persons are also worthy of note. Unlike most of us, they seem to retain their childhood wonder and amazement with the world. For them, life continues to be an exciting adventure rather than a humdrum routine. And finally, self-actualized persons sometimes experience what Maslow describes as **peak experiences**—instances in which they experience powerful feelings of unity with the universe and tremendous waves of power and wonder. Such experiences appear to be linked to personal growth, for after them, individuals report feeling more spontaneous, more appreciative of life, and less concerned with the problems of everyday life. Examples of people Maslow describes as being fully self-actualized are Thomas Jefferson, Albert Einstein, Eleanor Roosevelt, and Albert Schweitzer.

Harriet Tubman: An Example of Self-Actualization

According to Maslow, only a few people become fully self-actualized. Harriet Tubman, who dedicated her life to ending slavery, is one example; can you think of others?

Unconditional Positive Regard: *In Rogers's theory, communicating to others that they will be respected or loved regardless of what they say or do.*

Self-Actualization: *A stage of personal development in which individuals reach their maximum potential.*

Peak Experiences: *In Maslow's theory, intense emotional experiences during which individuals feel at one with the universe.*

Humanistic Theories: An Evaluation

Humanistic theories of personality hit psychology like a cyclone in the 1960s and 1970s. Large numbers of psychologists quickly adopted them as a frame-

Key Points

- Humanistic theories suggest that human beings strive for personal development and growth, not merely the satisfaction of biological needs.
- According to Rogers, all human beings possess the capacity to become fully functioning persons. Often, they do not reach this stage because distorted self-concepts interfere with personal growth.
- Maslow suggests that when lower-level needs are met, human beings strive to attain self-actualization—to become the best persons they can be.

work for understanding personality and a basis for new forms of psychotherapy. Like all storms, however, their impact first rose to a peak and then gradually diminished. Have these theories left a lasting impact? Definitely. Many of the ideas first proposed by Rogers, Maslow, and other supporters of the humanistic perspective have entered into the mainstream of psychology. For example, interest in the *self* as a central concept of personality has persisted and even spilled over into several other branches of the field (e.g., Baumeister, Heatherton, & Tice, 1993). Similarly, the contention that behavior stems more from positive forces, such as tendencies toward personal growth, than from primitive sexual and aggressive urges has done much to restore a sense of balance to current views of personality. And the importance of maintaining close contact with one's own feelings, emphasized in several humanistic theories, is seen as a positive development by many psychologists.

But humanistic theories have also been subject to strong criticism. Many psychologists are uncomfortable with their strong emphasis on personal responsibility, or *free will*. As you may recall, humanistic theories propose that individuals are responsible for their own actions and can readily change these if they wish to do so. To an extent, this notion is true. Yet it conflicts with *determinism:* the idea that behavior is determined by numerous different factors and can be predicted from them. And such determinism is one of the cornerstones of modern scientific psychology.

Second, many key concepts of humanistic theories are loosely defined. What, precisely, is self-actualization? A peak experience? A fully functioning person? Until such terms are clearly defined, it is difficult to know exactly what they mean and to conduct systematic research designed to test their validity.

Third, humanistic theorists have been criticized for making what some view as naive or overly optimistic assumptions about human nature. Are people really basically good? Many psychologists would answer that they are neither bad *nor* good. Rather, their behavior is a product of their past experience, current situations, and many other factors. Assuming that people are innately good, therefore, is as untenable as assuming that they are filled with innate destructive impulses.

Despite these criticisms, however, the impact of humanistic theories has persisted. One reason this is so is that, in contrast to the psychoanalytic approach, such theories have stimulated a considerable amount of research. One line of research related to, if not always stimulated by, humanistic theories of personality is described in the **Research Process** section below.

***Self-Disclosure:** The act of revealing information about oneself to another person.*

The Research Process

Self-Disclosure: The Potential Benefits of Revealing Ourselves to Others

The *self-concept* plays a crucial role in several humanistic theories. Rogers (1977, 1982) suggested that it is distortions in the self-concept that block natural growth and are ultimately responsible for many forms of psychological disorder. One idea that follows logically from such suggestions is that **self-disclosure**—the process of revealing information about oneself to another person—can yield important benefits. Engaging in self-disclosure can increase the extent to which we understand ourselves. Such

understanding, in turn, can help us to close gaps between our self-concept and external reality (Jourard, 1971). Does self-disclosure actually yield positive effects? Before considering the research evidence, let's focus briefly on when and how self-disclosure usually occurs.

Self-Disclosure: The Stranger-on-the-Bus Effect and Other Basic Patterns

On a recent cross-country flight, I had an experience you have probably shared. The young woman sitting next to me began a conversation and within a matter of minutes was telling me all about her personal life—much more, in fact, than I really cared to know. She described intimate details of her current romance, her relations with her parents, and the problems she was having with one of her coworkers. What she said was interesting—I *am* a psychologist!—but I was on my way to give a talk, and I wanted to work on my notes. That was impossible, so I had to wing it that afternoon in front of a very large group.

Psychologists refer to this kind of incident, in which strangers engage in high levels of self-disclosure, as the *stranger-on-the-bus effect*. What makes it so interesting is that this kind of incident violates basic rules concerning when and how self-disclosure should take place. Such rules suggest that self-disclosure should be a gradual process (Altman & Taylor, 1973), increasing in intimacy only as two people get to know one another better, and that it should be *reciprocal* in nature (e.g., Davis & Franzoi, 1986). Why, then, does the stranger-on-the-bus effect occur? Probably because in such situations the persons engaging in self-disclosure realize that they'll never see the recipient of this intimate information again. Thus, they can act on their strong desire to get it off their chests with few, if any, consequences. If nothing else, the stranger-on-the-bus phenomenon suggests both our strong desire to bare our souls to others and our informal realization of the fact that such experiences can have beneficial effects.

Individual Differences in Self-Disclosure: The Roles of Gender and Social Anxiety

As you probably know from your own experience, there are large individual differences in the tendency to engage in self-disclosure. Some persons readily reveal personal information, while others are very reluctant to do so. Are there any factors that predict whether a specific person will be relatively high or low in self-disclosure? Research findings indicate that there are.

First, there appear to be small, but relatively consistent, gender differences in self-disclosure (Hosman, 1986). One meta-analysis covering almost twenty-five thousand participants (Dindia & Allen, 1992) found that females engaged in slightly more self-disclosure than males. The word *slightly* should be emphasized, however, because the difference was far from large.

Another factor that plays an important role in such behavior is *social anxiety* or *shyness*. The results of several studies indicate that socially anxious persons do *not* show the usual reciprocity in self-disclosure. On the contrary, they engage in low to moderate levels of self-disclosure regardless of what others do (Arkin, Lake, & Baumgardner, 1986). Such effects are clearly illustrated by a study conducted recently by Meleshko and Alden (1993). These researchers arranged for participants low and high in social anxiety to encounter an assistant who, during a brief interaction, demonstrated either a low or a high level of self-disclosure. As predicted, participants who were high in social anxiety did *not* reciprocate the assistant's behavior; they showed a moderate level of self-disclosure in both conditions. In contrast, participants low in social anxiety did engage in reciprocation; they echoed the assistant's behavior with relatively low or high levels of self-disclosure. In sum, individual differences in the tendency to engage in self-disclosure seem to be related to factors such as gender and social anxiety.

Self-Disclosure, Adjustment, and Health

Now, back to the question with which we began: Does self-disclosure actually confer real benefits on the people who engage in it? Growing evidence suggests that

Self-Disclosure: Gender Differences

Research shows that women engage in slightly more self-disclosure than men, especially when interacting with other women.

it does. In fact, growing evidence indicates that self-disclosure can be beneficial to physical as well as psychological health (Pennebaker, 1990; Pennebaker, Hughes, & O'Heeron, 1987). For example, Pennebaker, Kiecolt-Glaser, & Glaser (1988) asked college students to write for about twenty minutes each day about one of two topics: their deepest thoughts and feelings concerning some traumatic event they had experienced, or their thoughts and feelings concerning superficial topics (for instance, a description of their living rooms). Among the traumatic events disclosed by the students were instances of rape, child abuse, intense family conflict, and the death of loved ones. Participants gave blood samples before they started writing, after the last writing session, and six weeks later. Analysis of these blood samples indicated increased functioning of the immune system among those who wrote about traumatic events, both at the end of the study and six weeks later. In addition, persons who wrote about traumatic events subsequently had fewer visits to the campus health center for illness than those who wrote about trivial topics. Finally, and perhaps most revealing, persons who indicated that they had revealed things in their essays that they had previously held back from others experienced the greatest improvement in immune function. That is, they benefited most from disclosing their upsetting experiences. Needless to say, such results must be replicated before they can be accepted with a high degree of confidence. Still, these and other findings indicate that, as suggested by humanistic theories of personality, self-disclosure, at least under some conditions, can be beneficial in several different ways.

Critical Thinking Questions

1. Can you think of other possible reasons why females engage in more self-disclosure than males, aside from prevailing gender roles or norms?
2. Do you think that the reluctance of shy persons to reciprocate self-disclosure from others has any negative effects on their social interactions? For example, could this tendency reduce others' liking for them?
3. Engaging in self-disclosure (under appropriate circumstances and to appropriate persons) seems to have important potential benefits. Why, then, are so many people so reluctant to engage in self-disclosure?
4. It has been suggested that one reason many people seek religious confession or psychotherapy, or keep personal diaries, is that through such activities they gain the benefits of self-disclosure. Do you think this is true? If so, why? If not, why not?

Trait Theories: Seeking the Key Dimensions of Personality

When we describe other persons, we often do so in terms of specific **personality traits**—stable dimensions of personality along which people can vary. This strong tendency to think about others in terms of specific characteristics is reflected in **trait theories** of personality. Such theories focus on identifying key dimensions of personality—the most important ways in which people differ. The basic idea behind this approach is as follows: Once we know *how* people differ, we can measure how *much* they differ, and can then relate such differences to behavior in a wide range of settings.

Personality Traits: *Specific dimensions along which individuals' personalities differ in consistent, stable ways.*

Trait Theories: *Theories of personality that focus on identifying the key dimensions along which people differ.*

Unfortunately, this task sounds easier than it actually is. Human beings differ in an almost countless number of ways. How can we determine which of these are most important and perhaps most stable? The scope of the problem was first suggested by a famous study conducted by Allport and Odbert (1936). By consulting a standard dictionary, these researchers identified fully *17,953* words in English that referred to specific traits. Even when words with similar meanings were combined, 171 distinct traits remained. How can we hope to deal with this multitude of traits? One solution is to search for *clusters*—groups of traits that seem to go together. Let's now examine some theories that have adopted this approach. Then we'll turn to recent evidence

suggesting that in the final analysis, the number of key traits or dimensions we must consider is actually relatively small.

Allport's Central, Secondary, and Cardinal Traits

If you have a successful older sister or brother, you can empathize with Gordon Allport: He grew up in the long shadow of his brother Floyd. By the time Gordon entered Harvard as a freshman, his brother was already a graduate student; later, Gordon actually took a course from his older brother—something few universities would permit today. But the two brothers chose different specialties in psychology: Floyd became a well-known social psychologist, while Gordon chose the study of personality.

Allport concluded that personality traits could be divided into several major categories. Of least importance are **secondary traits**, which exert relatively weak effects on behavior. More important are **central traits**: the five to ten traits that together best account for the uniqueness of an individual's personality. Finally, Allport noted that a few people are dominated by a single all-important **cardinal trait**. A few examples of such persons and the cardinal traits that seemed to drive their personalities: Alexander the Great (ambition), Machiavelli (lust for power), and Don Juan (just plain lust).

Perhaps an even more important aspect of Allport's theory of personality is his concept of **functional autonomy** (Allport, 1965)—the idea that patterns of behavior that are initially acquired under one set of circumstances, and which satisfy one set of motives, may later be performed for very different reasons or motives. For example, initially, a child may learn to read because this pleases his teachers and parents and because failure to do so is punished. Later in life, however, the same person may read because he has come to enjoy this activity in and of itself. Notice how this contrasts with Freud's view that the roots of adult personality are planted firmly in the soil of childhood—that, as Freud himself put it, "The child is the father [mother] of the man [woman]." For Allport, such connections are not necessarily present. On the contrary, our adult behavior may spring from roots entirely different from those that gave rise to our childhood behavior.

Cattell's Surface and Source Traits

Another well-known advocate of the trait approach is Raymond Cattell. He and his colleagues have focused firmly on the task described earlier: identifying the basic dimensions of personality. Instead of beginning with hunches or insights, however, Cattell has followed a very different approach. He has conducted extensive research in which literally thousands of persons responded to measures designed to reflect individual differences on hundreds of traits. These responses were then subjected to a statistical technique known as *factor analysis*. This technique reveals patterns in the extent to which various traits are correlated. In this manner, it can help to identify important *clusters* of traits—ones that seem to be closely linked to one another. As such clusters are identified, Cattell reasoned, the number of key traits in human personality can be reduced until we are left with those that are truly central.

Using this approach, Cattell and his associates (e.g., Cattell & Dreger, 1977) have identified sixteen basic **source traits**—ones he believes underlie differences in many other, less important *surface traits*. It is not yet clear whether this is actually the case, but at least the list Cattell proposes is more manageable in length than previous ones. (See Table 12.2 on page 482 for a list of these traits.)

Secondary Traits: *According to Allport, traits that exert relatively specific and weak effects upon behavior.*

Central Traits: *According to Allport, the five or ten traits that best describe an individual's personality.*

Cardinal Trait: *According to Allport, a single trait that dominates an individual's entire personality.*

Functional Autonomy: *In Allport's theory, maintenance of patterns of behavior by motives other than the ones originally responsible for the behavior's occurrence.*

Source Traits: *According to Cattell, key dimensions of personality that underlie many other traits.*

TABLE 12.2

Cattell's Sixteen Basic Dimensions of Personality

According to Cattell, the sixteen *source traits* shown here are the most important or basic ones and underlie differences in many other, less crucial *surface traits*. The two columns in the table list the extremes or end points for each trait (dimension).
(*Source*: Adapted from the *Sixteen Personality Factor Questionnaire*, Cattell and the Institute for Personality and Ability Testing, 1983.)

End Points on Sixteen Dimensions of Personality	
Cool, reserved	Warm, easygoing
Concrete thinking	Abstract thinking
Easily upset	Calm, stable
Not assertive	Dominant
Sober, serious	Happy-go-lucky
Expedient	Conscientious
Shy, timid	Venturesome
Tough-minded	Tender-minded
Trusting	Suspicious
Practical	Imaginative
Forthright	Shrewd
Self-assured	Apprehensive
Conservative	Experimenting
Group-oriented	Self-sufficient
Undisciplined	Self-disciplined
Relaxed	Tense, driven

***Extraversion**: One of the "big five" dimensions of personality; ranges from sociable, talkative, fun-loving at one end to sober, reserved, cautious at the other.*

***Agreeableness**: One of the "big five" dimensions of personality; ranges from good-natured, cooperative, trusting at one end to irritable, suspicious, uncooperative at the other.*

***Conscientiousness**: One of the "big five" dimensions of personality; ranges from well-organized, careful, responsible at one end to disorganized, careless, unscrupulous at the other.*

***Emotional Stability**: One of the "big five" dimensions of personality; ranges from poised, calm, composed at one end to nervous, anxious, excitable at the other.*

***Openness to Experience**: One of the "big five" dimensions of personality; ranges from imaginative, sensitive, intellectual at one end to down-to-earth, insensitive, crude at the other.*

Five Robust Factors: A Modern Framework

I began this discussion of trait theories with what seemed to be a fairly straightforward question: What are the key traits or dimensions of human personality? By now you realize that this issue is more complex than it seems. Fortunately, though, this is one instance in which we do *not* have to leave matters dangling. Sophisticated research conducted since the 1970s has begun to converge on a refreshingly simple conclusion: In fact, there may be only five key or central dimensions of personality (Costa & McCrae, 1994; Digman, 1990; McCrae, 1989). These are sometimes labeled the five robust dimensions:

1. **Extraversion**: A dimension ranging from sociable, talkative, fun-loving, affectionate, and adventurous at one end to retiring, sober, reserved, silent, and cautious at the other.
2. **Agreeableness**: A dimension ranging from good-natured, gentle, cooperative, trusting, and helpful at one end to irritable, ruthless, suspicious, uncooperative, and headstrong at the other.
3. **Conscientiousness**: A dimension ranging from well-organized, careful, self-disciplined, responsible, and scrupulous at one end to disorganized, careless, weak-willed, and unscrupulous at the other.
4. **Emotional stability**: A dimension ranging from poised, calm, composed, and not hypochondriacal at one end to nervous, anxious, excitable, and hypochondriacal at the other.
5. **Openness to experience**: A dimension ranging from imaginative, sensitive, intellectual, and polished at one end to down-to-earth, insensitive, crude, and simple at the other.

How basic, and therefore important, are the "big five" robust dimensions? Many researchers believe that the answer is clear: *very basic*. This is indicated, in part, by the fact that these dimensions are ones to which most people in many different cultures refer in describing themselves (Funder & Colvin, 1991). In addition, these dimensions are readily apparent to total strangers, even in a very brief meeting (Watson, 1989). Compelling evidence for this latter conclusion is provided by an important study conducted recently by Funder and Sneed (1993).

These researchers videotaped pairs of unacquainted college students as they interacted with one another for the first time. The researchers coded sixty-two different behaviors, such as "has high enthusiasm and energy level," "says or does interesting things," "shows lack of interest in the interaction," "appears relaxed and comfortable," "expresses hostility," "speaks fluently." A second group of participants then rated each of these behaviors in terms of how useful they thought they were for determining where others stood on each of the "big five" personality dimensions—conscientiousness, extraversion, agreeableness, and so on. Finally, two persons very familiar with each participant described each participant's personality. On the basis of these descriptions, a rating of each participant for each of the big five dimensions was obtained.

With all these data in hand, Funder and Sneed (1993) could address the following questions: (1) Are the behaviors people believe are important in rating others' personalities the ones we actually use in judging others' personalities? (2) Are these behaviors actually useful in making accurate judgments about others' personalities? The answer to both questions was a clear *yes*. Strangers did tend to use the behaviors identified by participants as useful in making judgments of others' personalities. And these behaviors were indeed useful in making such judgments: They were closely related to the descriptions of participants' personalities provided by persons who knew them well. This was especially true for three of the big five dimensions—extraversion, agreeableness, and conscientiousness—although it was less true for emotional stability and did not seem to hold for openness. In sum, where people stand on several of the big five dimensions is readily apparent in their behavior, and we can make fairly accurate judgments about people's standing on each of these dimensions even on the basis of very brief meetings with them.

WHOOPI GOLDBERG: AN EXAMPLE OF EXTRAVERSION

According to the five-factor theory of personality; there are only five key dimensions that make up personality; extraversion is one of them. How would you describe yourself on each trait?

KEY POINTS

- Allport suggested that human beings possess a small number of central traits that account for much of their uniqueness as individuals.
- Cattell has identified sixteen source traits that, he believes, underlie differences between individuals on many specific dimensions.
- Research findings point to the conclusion that there are only five basic dimensions of personality: extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience.

TRAIT THEORIES: An Evaluation

In the 1990s, most research on personality reflects the trait approach. Instead of seeking to propose and test grand theories such as the ones offered by Freud, Jung, and Rogers, most personality psychologists currently direct their effort to the task of understanding specific traits—ones that appear to exert important effects on behavior in key areas of life (Friedman et al., 1993; Kring, Smith, & Neale, 1994). This trend is due both to the success of the trait approach and to the obvious shortcomings of the theories described in earlier sections of this chapter.

This is not to imply that the trait approach is perfect, however. On the contrary, it, too, can be criticized in several respects. First, the trait approach is largely *descriptive* in nature. It seeks to describe the key dimensions of person-

ality but does not attempt to determine *how* various traits develop or *how* they influence behavior. Thus, in a sense, the trait approach has not generated fully developed theories of personality in the way that other approaches have. Second, despite several decades of careful research, there is still no final agreement concerning the traits that are most important and that constitute the basic dimensions of personality. The five robust factors described above come closest to this goal, but acceptance of these is by no means universal, and they have not emerged as separate and distinct aspects of personality in all research projects (Church & Burke, 1994; Waller & Ben-Porath, 1987).

As you can readily see, these criticisms relate primarily to what the trait approach has not yet accomplished rather than to its findings or proposals. All in all, we can conclude that this approach to personality has generally been a valuable one. Attempting to understand how people differ appears to be a useful strategy for understanding the uniqueness and consistency of key aspects of human behavior.

Learning Approaches to Personality

Whatever their focus, all personality theories must ultimately come to grips with two basic questions: What accounts for the *uniqueness,* and what underlies the *consistency,* of human behavior? Freud's answer focused almost entirely on *internal* factors—hidden conflicts between the id, ego, and superego and the active struggle to keep unacceptable impulses out of consciousness. At the other end of the continuum are approaches to personality that emphasize the role of learning and experience. While such views were not originally presented as formal theories of personality, they are often described as *learning theories of personality* to distinguish them from other perspectives (Bandura, 1986; Rotter, 1982; Skinner, 1974).

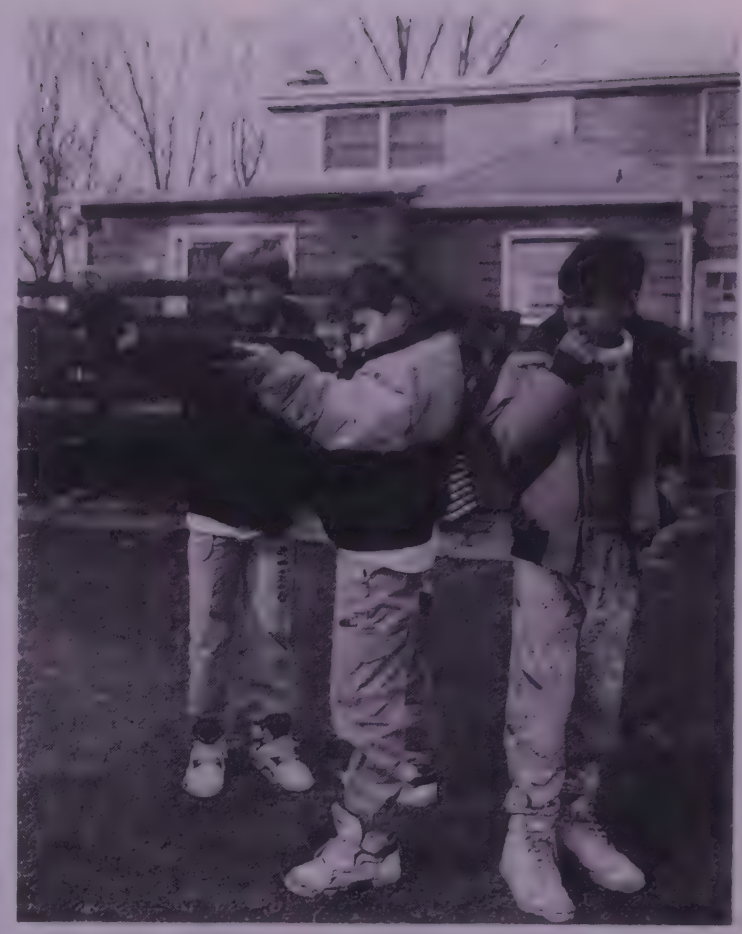
How can a learning perspective account for the uniqueness and the consistency of human behavior? Very readily. Uniqueness, the learning approach contends, merely reflects the fact that we have all experienced distinctive life (and learning) experiences. Similarly, the learning approach can explain consistency in behavior over time and across situations by noting that the responses, associations, or habits acquired through learning tend to persist. Moreover, since individuals often find themselves in situations very similar to the ones in which they acquired these tendencies, their behavior, too, tends to remain quite stable.

Early learning-oriented views of personality demonstrated another important characteristic. In general, learning theorists denied the importance of considering virtually *any* internal causes of behavior—motives, traits, intentions, goals (Skinner, 1974). The only things that matter, these theorists suggested, are external conditions determining patterns of reinforcement; recall the discussion of this topic in chapter 5. At present, few psychologists agree with this position. Most now believe that internal factors play a crucial role in behavior. Moreover, several theorists contend that these internal factors must be carefully considered if we are ever to understand both uniqueness and consistency in human behavior. As an example of this approach, which more accurately reflects the flavor of modern psychology, let's consider the *social cognitive theory* proposed by Bandura (1986).

Social Cognitive Theory: Reciprocal Causality in Human Behavior

In his **social cognitive theory**, Albert Bandura, a past president of the American Psychological Association, notes that people do indeed acquire many forms of behavior through basic processes of learning—operant conditioning and classical conditioning. He adds, however, that a third form—*observational learning*, described in chapter 5—is of special importance. In observational learning, individuals acquire both information and new forms of behavior through observing others (Bandura, 1977). And such learning plays a role in a very wide range of human activities—everything from aggression, which can be acquired by observing violent models in daily life or in television shows and movies, through many types of task performance, which can be acquired from watching other persons at work or from instructional videotapes and manuals.

Bandura also calls attention to the fact that learning is far from the entire story where human behavior and personality are concerned. In addition, many cognitive factors play a role. Unlike many other animals, Bandura notes, human beings do not respond passively or automatically to the external conditions around them. Instead, they plan, form expectancies, set goals, imagine possible outcomes, and so on. In short, people's actions are often strongly determined by a wide range of cognitive factors that were totally ignored both by early behaviorists and by early learning theories of personality.



TV and Violence

According to Bandura, children learn that aggression is acceptable—and sometimes even admirable—through watching violent models on television.

In addition, Bandura (1986) notes, human beings often demonstrate impressive capacity for the *self-regulation* of their own behavior. While people may often respond to external factors such as positive reinforcement and punishment, they sometimes choose to ignore these and to operate in terms of internal standards and values. We set our own goals, and we often provide our own rewards when we reach them—a process known as **self-reinforcement**. Moreover, these rewards range from a direct pat on our own backs, through more generalized feelings of personal accomplishment. For example, consider the hundreds of amateur runners who participate in major marathons. Few believe that they have any chance of winning and obtaining the external reinforcements offered—status, fame, cash prizes. Why, then, do they run? Because, Bandura would contend, they have *self-determined goals*, such as finishing the race, or merely going as far as they can. And meeting these goals is sufficient to initiate what is obviously very effortful behavior.

Another important concept in Bandura's theory is **self-efficacy**—perceived ability to carry out a desired action (Bandura, 1986). The higher a person's feelings of self-efficacy, the better that person tends to do at a wide range of tasks. And such success, of course, can ultimately lead to more generalized positive feelings about oneself. We'll return to such feelings (often termed *self-esteem*) below.

Other learning-oriented approaches to personality share a similar perspective. For example, the *social learning theory* proposed by Julian Rotter (1954, 1982) suggests that the likelihood that a given behavior will occur in a specific situation depends on individuals' *expectancies* concerning the outcomes the behavior will produce and the *reinforcement value* they attach to such outcomes—the degree to which they prefer one reinforcer over another.

Social Cognitive Theory: *A theory of behavior suggesting that human behavior is influenced by many cognitive factors as well as by reinforcement contingencies, and that human beings have an impressive capacity to regulate their own actions.*

Self-Reinforcement: *The delivery of rewards to oneself for reaching one's self-set goals.*

Self-Efficacy: *Individuals' expectations concerning their ability to perform various tasks.*

KEY POINTS

- Learning approaches to personality suggest that personality is strongly influenced by basic forms of learning. Early learning theories of this type denied the importance of internal factors such as goals and expectancies.
- More modern learning approaches, such as Bandura's social cognitive theory, assume that behavior is influenced by cognitive factors and personal dispositions as well as by reinforcement contingencies and the social and physical environment.
- Rotter's social learning approach calls attention to the importance of generalized expectancies concerning the internal or external control of outcomes.

According to Rotter, on the basis of their experience, individuals also form *generalized expectancies* concerning the extent to which their own actions determine the outcomes they experience. Rotter calls persons who strongly believe that they shape their own destinies **internals** and those who believe their outcomes are largely the result of forces outside their control **externals**. As you can probably guess, internals are often happier and better adjusted than externals. Note again how in this theory, internal factors such as subjective estimates concerning the likelihood of various outcomes, subjective reactions to these, and generalized expectancies of personal control play an important role in behavior. Certainly, such contentions contrast very sharply with the view, stated in early learning approaches to personality, that only external reinforcement contingencies should be taken into account.

EVALUATION OF THE LEARNING APPROACH

Do all human beings confront an Oedipus conflict? Are peak experiences real, and do they in fact constitute a sign of growing self-actualization? Considerable controversy exists with respect to these and many other aspects of psychoanalytic and humanistic theories of personality. In contrast, virtually all psychologists agree that behaviors are acquired and modified through basic processes of learning. Moreover, in the 1990s, after the "cognitive revolution" of the 1970s and 1980s (see chapters 6 and 7), there is general agreement about the importance of cognitive factors in human behavior. Thus, a key strength of the learning approach is obvious: It is based on widely accepted principles in psychology, principles for which there is an impressive amount of evidence.

Another positive feature of this framework for understanding personality lies in the fact that it has been put to effective, practical use in efforts to modify maladaptive forms of behavior. Such efforts have proved to be quite effective in treating a wide range of psychological disorders (Sherman, 1990); we'll consider these therapies in detail in chapter 15. Finally, it should be noted that in contrast to other major theories of personality, learning approaches have been put to empirical test in ongoing research and rest on an extensive body of research findings.

Turning to criticisms, most of these have focused on older behaviorist approaches rather than on the more sophisticated theories proposed by Bandura (1986) and others. Those early behaviorist theories generally ignored the role of cognitive factors in human behavior and frequently assumed that principles uncovered in research with animals would transfer readily to human beings. Such views ignored human capacities for self-regulation of behavior and the important fact that cognitive factors such as beliefs and expectancies may often be more important determinants of overt actions than reinforcement contingencies.

***Internals**: In Rotter's terms, individuals who believe that they exert considerable control over the outcomes they experience.*

***Externals**: In Rotter's terms, individuals who believe that they have little control over the outcomes they experience.*

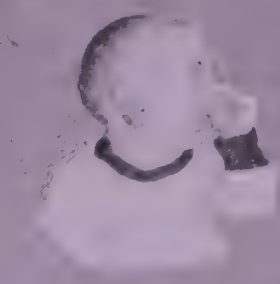
As you can readily see, these criticisms do not apply to new learning approaches such as social cognitive theory. In fact, it seems fair to state that at present these social cognitive theories of personality are more in tune with the eclectic approach of modern psychology than any others. As such, they are certain to play an important role in continuing efforts to understand many aspects of personality. Please see the **Key Concept** page for an overview of several major theories of personality discussed in this chapter.

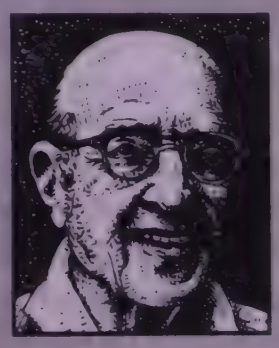
KEY CONCEPT

Major Theories of Personality: An Overview

Theory	Major Focus	Key Concepts
Psychoanalytic Theory	Levels of consciousness	Conscious, preconscious, unconscious
	States of psychosexual development	Oral, anal, phallic, latency, genital
	Anxiety and defense mechanisms	Repression, rationalization, displacement, projection, regression
Humanistic Theories	Personal growth, personal responsibility	Self-concept, self-actualization
	The present rather than the past	
Trait Theories	Stable dimensions of personality along which people vary	Cardinal traits, central traits, surface and source traits; the "big five" dimensions of personality
Learning Approaches	Role of basic learning processes in establishing the uniqueness and stability of individual behavior	Operant conditioning, observational learning
	Self-regulation of behavior	Self-efficacy
		Internal versus external locus of control

Freud



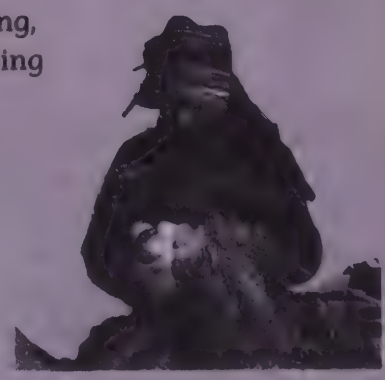


Rogers

Maslow

Recent findings indicate that individual differences in *shyness*—one aspect of temperament—are present shortly after birth and tend to persist through life.

Even in a brief meeting, it would be apparent to you that Whoopi Goldberg rates high on *extraversion*—one of the "big five" dimensions of personality.



KEY ASPECTS OF PERSONALITY: A Sample of Recent Research

In recent decades efforts to understand personality have undergone a major shift. Rather than attempting to construct grand theories, psychologists have focused on efforts to identify and investigate key aspects of personality. One idea behind this approach is that a fuller understanding of personality will gradually emerge from knowledge about these factors and the ways in which they interact. Reflecting this modern approach, let's look at modern research findings concerning several intriguing aspects of personality.

TWO ASPECTS OF THE SELF: Self-Esteem and Self-Monitoring

Many different theorists have suggested that in several respects, our *self-concept*—our beliefs and knowledge about ourselves—plays a crucial role in our total personality (Benesch & Page, 1989). Reflecting this emphasis, much current research on personality is concerned with various aspects of the self. Here, we'll focus on two aspects of the self that have been the focus of special attention: *self-esteem* and *self-monitoring*.

SELF-ESTEEM: SOME EFFECTS OF FEELING GOOD—OR BAD—ABOUT OURSELVES

How do you feel about yourself? Generally good? Generally bad? Most people tend to hold relatively favorable views of themselves; they realize that they aren't perfect, but in general they conclude that their good points outweigh their bad ones. Large individual differences with respect to such self-evaluations exist, however, so one important aspect of the self is **self-esteem**: the extent to which our self-evaluations are favorable or unfavorable (Campbell, 1990; Epstein, 1983).

As you can probably guess, self-esteem is related to many forms of behavior. Persons who are high in self-esteem tend to report fewer negative emotions and less depression than persons who are low in self-esteem (Straumann & Higgins, 1988). Similarly, persons high in self-esteem are better able to handle stress, and they experience fewer negative health effects when exposed to it (Brown & McGill, 1989).

Findings reported recently by Straumann, Lemieux, and Coe (1993) help explain why this may be so. These researchers induced anxious, depressed, or control participants to think about themselves by asking them to consider questions about various traits; for example, "Is it important for you to be . . . ?" "Would your parents say that they want you to be . . . ?" Participants' answers to other questions were used to measure the gap between their ideal and actual selves. As expected, this gap was larger for depressed and anxious persons than for controls. In addition, both anxious and depressed persons (who, presumably, were lower in self-esteem than controls) showed signs of reduced efficiency in their immune system when they thought about themselves: Activity in the immune system's natural "killer cells" decreased. Controls, who presumably had higher self-esteem, did *not* experience such effects. These findings are consistent with the view that low self-esteem, or states linked to it, can reduce the effectiveness of the immune system, thus placing low-self-esteem persons at increased risk for many illnesses.

Self-Esteem: *The extent to which individuals have positive or negative feelings about themselves and their own worth.*

Other findings indicate that persons high in self-esteem, as compared to those low in self-esteem, are less susceptible to influence (Wylie, 1974), more

confident of achieving their goals (Wells & Marwell, 1976); and more effective in social situations—that is, they make more favorable impressions on others (Baron & Byrne, 1994).

Finally, persons low and high in self-esteem also differ with respect to the clarity of their own self-concepts. Those low in self-esteem report less confidence in their judgments when asked to rate themselves on various traits and show less tendency to report the same ratings over time than do high self-esteem persons (Campbell, 1990). In addition, persons low in self-esteem show less consistency in their self-ratings. When asked to rate the extent to which adjectives that are opposite in meaning describe them, they are more likely than high self-esteem persons to say that both opposite adjectives apply (Campbell, 1990). Together, these findings suggest that persons low in self-esteem have self-concepts that are less clear or well-developed than those of persons high in self-esteem. Such uncertainty has been found to be negatively related to resistance to stress: People who have less clear-cut self-concepts are more vulnerable to the harmful effects of stress (Brown & Smart, 1989). This interesting finding has direct applications for people's health. We'll discuss individual differences in resistance to stress in chapter 13.

Looking back over these diverse findings, it is easy to conclude that high self-esteem is desirable, while low self-esteem is undesirable—and perhaps even dangerous to one's health. In general, these conclusions are true. But recent findings indicate that high self-esteem, too, can sometimes have its costs. Persons high in self-esteem may sometimes suffer from *overconfidence*—unrealistically optimistic expectations. For example, they may set unrealistic goals or commit themselves to doing more than they can actually accomplish (Vallone et al., 1990). Direct evidence for such effects is provided by research carried out by Baumeister, Heatherton, and Tice (1993).

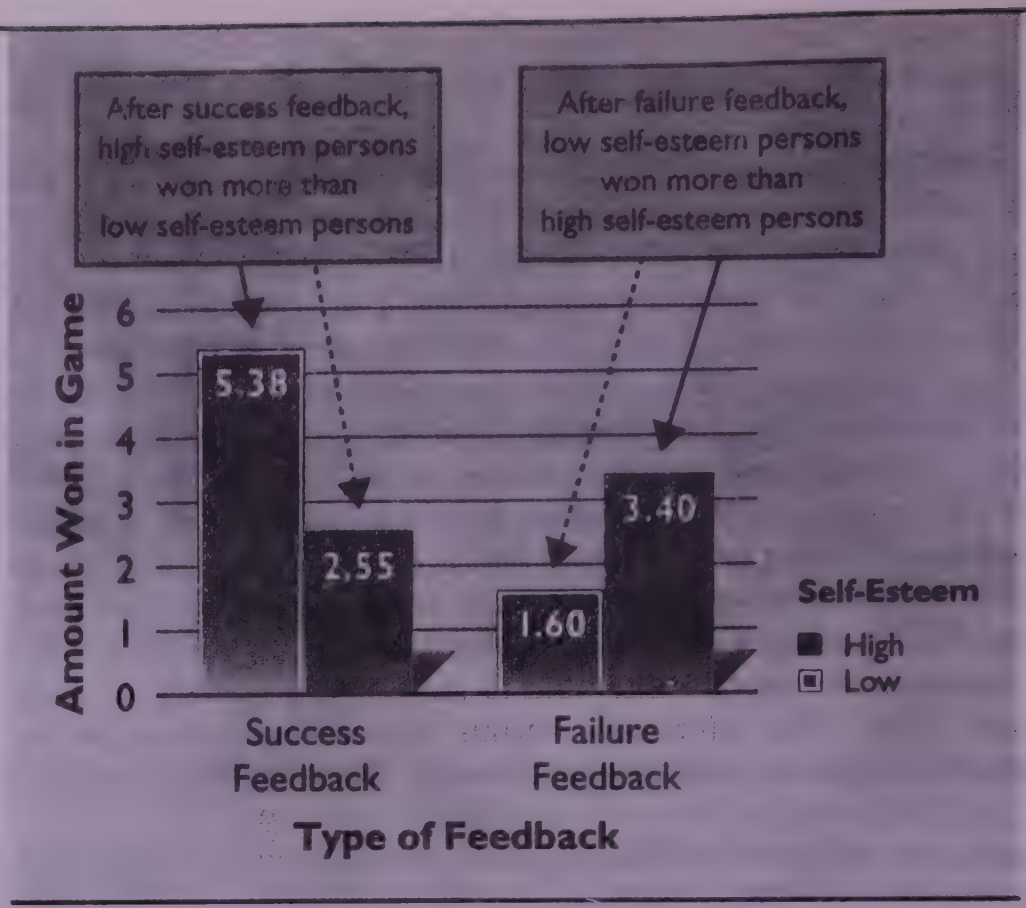
These investigators reasoned that under normal conditions, persons high in self-esteem have an edge over those low in self-esteem with respect to performing many tasks, because they have more complete and consistent self-knowledge and can do a better job at choosing the most desirable goals —ones that are challenging but within their reach. However, the situation changes radically when high-self-esteem persons are exposed to threats to their ego from negative feedback. Under these conditions, they may become unduly concerned with protecting their favorable self-concept, and this may interfere with their performance. In contrast, persons low in self-esteem do not react as strongly to ego threats and so should suffer smaller decrements in performance in negative-feedback situations.

To test these predictions, Baumeister et al. (1993) had high- and low-self-esteem participants play a computer game in which they navigated an airplane through an obstacle course. Before playing the game, participants worked on another task: coming up with as many uses as possible for a doughnut. Some were told that they did very well on this task and were highly creative, while others received negative feedback. While playing the computer game, participants were told that they must bet on the outcome. They had to bet at least 25¢ of a $3.00 payment they received, but they could bet anything up to the full amount. If they met a criterion based on their doughnut performance, they would receive triple their bet; if they failed to meet it, they would lose the entire bet. Baumeister and his colleagues predicted that after receiving failure feedback (an ego threat), high-self-esteem participants would be more likely to make inappropriate bets and would actually do worse than those low in self-esteem. After receiving success feedback, however, they would do better than low-self-esteem persons. As shown in Figure 12.4 (on page 490), this is precisely what happened.

FIGURE 12.4

When High Self-Esteem Can Hurt

When they received feedback indicating they had failed at a preliminary task, persons high in self-esteem actually did worse in terms of making appropriate bets, and so won less money, than persons low in self-esteem. In contrast, when both groups received feedback indicating they had succeeded, persons high in self-esteem did better than those low in self-esteem. These findings indicate that in situations involving ego threat, high self-esteem can actually interfere with performance. (*Source:* Based on data from Baumeister, Heatherton, & Tice, 1993.)



While high self-esteem is generally a plus, then, this is not always true. Under most conditions, high-self-esteem persons do a better job of regulating their own behavior than low-self-esteem persons. As a result, they may well set themselves up for confirmation of their favorable self-concept: One success, stemming from wisely chosen goals, follows another. When their egos are threatened, however, such persons may focus their attention on the task of protecting or restoring their self-esteem, with the result that they may slip into ineffective, self-defeating strategies. In contrast, low-self-esteem persons are accustomed to being kicked around in life and may not suffer equal decrements in performance. In such situations, then, self-esteem may fail to confer the kind of benefits with which it is usually associated.

SELF-MONITORING: PUBLIC APPEARANCE AND PRIVATE REALITY Respond to each of the following statements with *true* or *false*:

When I am uncertain how to act in social situations, I look to the behavior of others for cues.

In different situations and with different people, I often act like very different persons.

My behavior is usually an expression of my true inner feelings, attitudes, and beliefs.

I would not change my opinions or the way I do things to please someone else or to win their favor.

Self-Monitoring: *A personality trait involving sensitivity to social situations and an ability to adapt one's behavior to the demands of those situations in order to make favorable impressions on others.*

If you answered *true* to the first two statements but *false* to the remaining two, you may well be high in another interesting dimension of personality. In contrast, if you answered *false* to the first two and *true* to the others, you may well be relatively low on this dimension. This trait, **self-monitoring**, relates primarily to the ability to adapt one's behavior to the demands of a current social situation. Persons high in self-monitoring are like social chameleons—

they can change their behavior to match the current situation. (Chameleons are small lizards capable of altering their skin color to match different backgrounds.) If high self-monitors find themselves among beer-drinking construction workers, they roll up their sleeves and swig some beer. If, instead, they find themselves among wine conoisseurs, they roll *down* their sleeves and sip with the best of them. In short, they adjust what they say and what they do to the current situation in order to make a positive impression on others (Snyder, 1987; Snyder & Gangestad, 1986). In contrast, persons low in self-monitoring tend to show a higher degree of consistency: They act much the same across a wide range of situations.

Self-monitoring also involves several other factors, such as the ability to control and modify one's own behavior, or skill in what might be termed *acting;* sensitivity to the expressive behaviors of others (Lennox & Wolfe, 1984); willingness to serve as the center of attention; and concern with being liked by others (Briggs & Cheek, 1988). High self-monitors exceed low self-monitors on all of these dimensions.

Self-monitoring plays a role in many different aspects of behavior. First, consider choice of friends. Low self-monitors are often closely attuned to their own attitudes and values. Thus, it seems reasonable to expect that they will often like others who resemble themselves in various ways—people who share their views and beliefs. In contrast, high self-monitors realize that they often act differently in different situations. As a result, they may like and choose as friends others who share their preferences for specific activities—people who enjoy doing the same things (Jamiesen, Lydon, & Zanna, 1987).

KEY POINTS

- Persons high in self-esteem are generally happier, healthier, and more successful at many tasks than persons low in self-esteem. They also have more consistent and well-developed self-concepts.
- High self-esteem is not always beneficial, however. Under conditions of ego threat, persons who are high in self-esteem may experience larger decrements in performance than those who are low in self-esteem.
- High self-monitors are better at reading others and better at making favorable impressions on them. In contrast, low self-monitors show more consistent behavior across situations.
- High self-monitors are more successful at social deception than low self-monitors, partly because they are better at regulating their own expressive behavior.

Next, consider dating and sexual relationships. Do you think high or low self-monitors will have a larger number of different partners? The answer is clear: High self-monitors report having had a greater number of different sexual partners and expect to have more partners in the future than do low self-monitors (Snyder, Simpson, & Gangestad, 1987).

Finally, high self-monitors are much better at certain kinds of social deception than low self-monitors. For example, they are better at managing their own nonverbal cues so as to conceal their true reactions from others (Friedman & Miller-Herringer, 1991). There are many situations in which such self-regulation of both verbal and nonverbal cues is necessary. Athletes aren't supposed to gloat openly after defeating their opponents; and therapists are supposed to refrain from acting like the character in the cartoon below, no matter what their patients say!

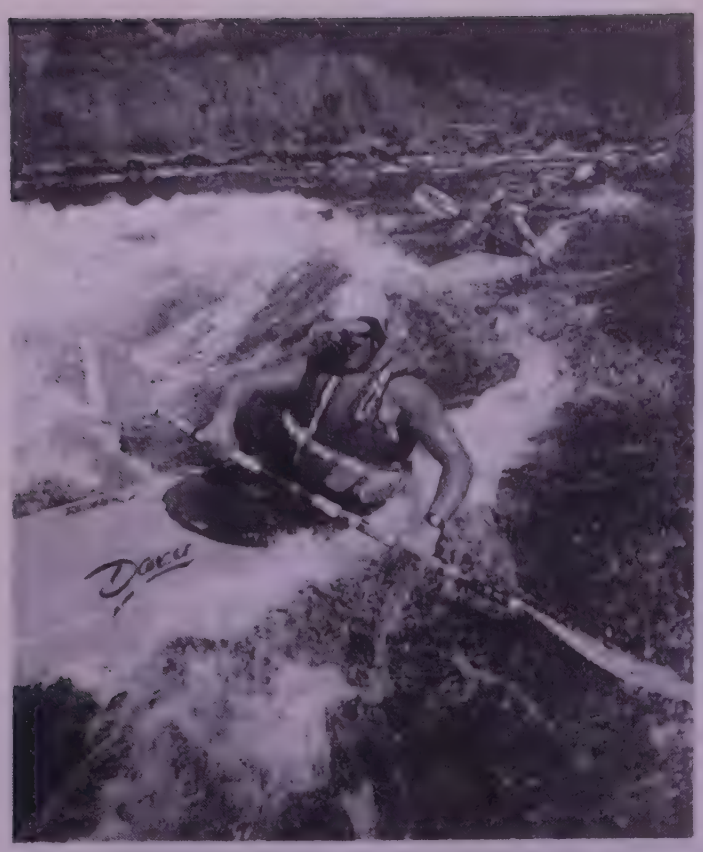
FAILURE TO REGULATE ONE'S EXPRESSIVE BEHAVIOR

There are many situations in which people are required to conceal their true feelings from others. (This therapist is clearly violating one such rule.) High self-monitors are generally more successful at this task than low self-monitors.
(*Source:* Drawing by Richter; © 1952, 1980 The New Yorker Magazine, Inc.)

"Why, you swine!"

SENSATION SEEKING: The Desire for Stimulation

When I was in high school, I had a friend named Lonny who had an insatiable desire for stimulation. I don't think I was timid, but where risk taking was concerned, I was definitely *not* in Lonny's league. One example: There was a high dam near where we lived. On one side was an artificial lake; on the other, a sheer drop of about eighty feet onto jagged rocks. The top of



HIGH-RISK SPORTS: A FAVORITE PASTIME OF HIGH SENSATION-SEEKERS

People who rate high in sensation seeking are attracted to activities like white-water kayaking.

the dam was narrow and slippery: When the water was high, it flowed over the top, and the plants that grew there made the dam slimy. One look at the rocks was enough to convince me that crossing the dam wasn't worth it. But Lonny insisted on crossing over and over again. In fact, to show us how easy it was, he even hopped across on one leg! When he wanted to cross blindfolded, though, we talked him out of it; that was too much even for a bunch of fifteen-year-old boys.

Today I'd describe Lonny as someone high in what psychologists term **sensation seeking**—the desire for new, exciting experiences (Zuckerman, 1990). Lonny liked high levels of arousal, and if the only way to achieve these was by exposing himself to danger, then that's the way it had to be. The dimension of *sensation seeking* is an aspect of personality that has received increasing attention from psychologists. Research on sensation seeking indicates that, compared to low sensation-seekers, high sensation-seekers drive faster (Zuckerman & Neeb, 1980) and are more likely to engage in substance abuse (Teichman, Barnea, & Rahav, 1989), more likely to get into trouble with the law while teenagers (Hamilton, 1983), and more likely to engage in high-risk sports such as skydiving (Humbaugh & Garrett, 1974). In short, they often lead lives in which they actively seek thrills and adventure wherever and however they can find them.

What accounts for this preference for dangerous behaviors and the high levels of arousal they produce? Zuckerman (1984, 1990), the psychologist who first called attention to this aspect of personality, believes that it has important roots in biological processes. High sensation-seekers, he suggests, are persons whose nervous systems operate best at high levels of arousal. Thus, for them, the optimal level of arousal is much higher than is true for other persons, and so they seek situations and activities that will generate such reactions.

Considerable evidence supports these views. First, high sensation-seekers show stronger *orienting response* to the initial presentation of an unfamiliar auditory or visual stimulus (Zuckerman, Simons, & Como, 1988). In other words, they seem to pay more attention to such stimuli than other persons. Second, high sensation-seekers show greater ability to ignore irrelevant information (Martin, 1986). So, in sum, they are better able than low sensation-seekers to zero in on new stimuli and give them their full attention. Such effects are clearly illustrated by a study conducted by Ball and Zuckerman (1992). These researchers asked high and low sensation-seekers to perform a *shadowing* task in which different lists of words were presented simultaneously to each ear. They were to repeat out loud only the words they heard in one ear. Results indicated that high sensation-seekers made fewer errors in this task than low sensation-seekers. Moreover, their performance improved more quickly than that of low sensation-seekers, thus indicating that they could establish a focus of attention more quickly.

Sensation Seeking: *A trait relating to the extent to which individuals seek and enjoy high levels of stimulation.*

Additional evidence for the view that sensation seeking is closely related to biological processes comes from research on patients undergoing treatment for pain. Among the patients studied, high sensation-seekers had lower levels of *endorphins*—natural substances produced within our brains that act somewhat like opiates—than low sensation-seekers (Johansson et al., 1979). Since endorphins are released by the body after painful experiences, one interpretation of these findings is that the bodies of high sensation-seek-

ers were working less hard to counteract pain—one source of high arousal and stimulation.

Whatever the precise basis for high sensation seeking, it is clear that persons demonstrating this characteristic do often engage in behaviors that expose them to danger. Does high sensation seeking always have negative implications for personal health or safety? There are some grounds for predicting that this may not be true. It seems possible, for example, that people high in sensation seeking might be better able to tolerate the emotional arousal produced by stressful life events. After all, their nervous systems operate best under high arousal, so they may be able to cope with stress more effectively than persons low in sensation seeking. Research by Smith, Ptacek, and Smoll (1992) provides support for this prediction. These psychologists found that high school athletes high in sensation seeking were actually *less* likely than athletes low in sensation seeking to experience injuries following stress (such as strong criticism from their coaches). One interpretation of these findings is that the high sensation-seekers were indeed better able to cope with stress than the low sensation-seekers and so had fewer injuries.

As is true for other aspects of personality, therefore, the effects of high sensation seeking are neither uniformly negative nor uniformly positive. In many cases, being high on this dimension does appear to have negative implications for one's health and well-being; but this is not always the case. In fact, in one area of life—participation in sports—being high in sensation seeking may confer important benefits.

Can knowledge about personality be put to practical use? For information on this issue, please see the **Point of It All** section below.

Key Points

- High sensation-seekers prefer higher levels of arousal than low sensation-seekers.
- High sensation-seekers show stronger orienting responses and are better able to focus their attention on new stimuli.
- High sensation-seekers are also better able to withstand the effects of stress than low sensation-seekers, and so experience fewer accidents in athletics following exposure to high levels of stress.

The Point of It All

Predicting Presidential Greatness: The Role of Personality

What makes a leader great? This is a question that has been posed over and over again throughout recorded history. The question itself is certainly stimulating, but the practical side of the issue is important too: If we knew why certain leaders are highly successful, we might be able to choose persons for leadership roles who shared the characteristics, whatever these were, that contributed to their greatness.

And this, according to recent research, is where knowledge of personality enters into the picture. While the notion that all great leaders are highly similar has not stood the test of time—or careful research—very well (see chapter 17), a growing body of evidence suggests that many leaders judged to be great in their own times or in later centuries *do* share certain characteristics; and several of these can perhaps best be described as personality traits (e.g., Kirkpatrick & Locke, 1991; Zaccaro, Foti, & Kennedy, 1991). For example, it appears that successful leaders are higher than other persons in such traits as integrity, achievement motivation (refer to chapter 10), and self-confidence. Further, they appear to be higher in *flexibility*—the capacity to recognize what

Presidential Greatness: Does Personality Play a Role?

Research suggests that several aspects of personality, including integrity, achievement motivation, and self-confidence, may be closely related to greatness. (Shown here are Presidents Thomas Jefferson, Abraham Lincoln, and Franklin Delano Roosevelt.)

actions are required in a given situation and then to act accordingly (Mumford et al., in press).

Perhaps the most dramatic evidence concerning the role of personality in greatness as a leader, however, is that relating to the perceived greatness of U.S. presidents (Simonton, 1986; McCann, 1992). Several studies have used the inaugural speeches of presidents as a basis for estimating their standing on a wide range of personality factors—need for achievement, conscientiousness, and others. These variables, plus many others, have then been related to ratings of greatness to indicate which factors are most important. Results have been mixed; but, in general, there is good support for the view that several aspects of personality are strong predictors of presidential greatness. In particular, one recent study (McCann, 1992) found that greatness could best be predicted from presidents' intelligence, height, attractiveness, certain aspects of conscientiousness, and achievement motivation. Thus, once a person is elected to office, the person's success may be determined, at least in part, by key aspects of his or her personality. Understanding personality, then, can prove invaluable in understanding the political processes that strongly influence our own lives.

Making Psychology Part of Your Life

How Accurate Is Your Self-Concept?

Self-knowledge is a useful thing; the better we understand ourselves, the better the choices we can make in many contexts and the more accurately we can predict our reactions to many events or situations. In addition, several theories of personality suggest that the more accurate our self-concept, the happier and better adjusted we will be (Maslow, 1970; Rogers, 1982). How well do you know *yourself?* Follow the procedures below and find out.

First, make about ten copies of the questionnaire given here. Next, complete one copy yourself. The third step is to give copies (blank, of course, except for your name in the space for it) to several people who know you well—good friends, family members, romantic partners. Try to have at least five to ten people provide ratings. Finally, average their ratings on each dimension and then compare these averages with your own ratings. The larger the differences, the less accurate your self-concept.

Do you find any dimensions on which your perceptions of yourself are sharply different from those of others—showing scale differences of one point or more? If so, consider why these differences exist. The insight you gain into your own traits and personality may prove very valuable.

Rate _____ on each of the dimensions below. Circle one number to indicate where she/he falls on this dimension (4 is the middle of the scale).

1. Cautious							Adventurous
	1	2	3	4	5	6	7
2. Insensitive							Sensitive
	1	2	3	4	5	6	7
3. Calm							Anxious
	1	2	3	4	5	6	7
4. Cooperative							Uncooperative
	1	2	3	4	5	6	7
5. Irresponsible							Responsible
	1	2	3	4	5	6	7
6. Composed							Excitable
	1	2	3	4	5	6	7
7. Sociable							Shy
	1	2	3	4	5	6	7
8. Suspicious							Trusting
	1	2	3	4	5	6	7
9. Imaginative							Down-to-earth
	1	2	3	4	5	6	7
10. Careless							Careful
	1	2	3	4	5	6	7

Note: Items on this scale relate to four of the five robust factors of personality described earlier in this chapter as follows: extraversion (items 1 and 7); agreeableness (4 and 8); conscientiousness (5 and 10); openness to experience (2, 7, and 9).

How well do you know yourself? Awareness of our own thoughts, feelings, and abilities can help us become happier and better adjusted.

Summary and Review of Key Points

Introduction Key Terms: personality, p. 460	• Personality consists of the unique and stable patterns of behavior, thoughts, and emotions shown by individuals. Behavior is influenced by both situational factors and personal dispositions. Such dispositions do appear to be relatively stable over time and across situations.
The Psychoanalytic Approach Key Terms: psychoanalysis, p. 463; id, p. 464; pleasure principle, p. 464; ego, p. 464; reality principle, p. 464; superego, p. 464; anxiety, p. 464; defense mechanisms, p. 465; sublimation, p. 465; reaction formation, p. 465; psychosexual stages of development, p. 465; libido, p. 466; fixation, p. 466; oral stage, p. 466; anal stage, p. 466; phallic stage, p. 466; Oedipus complex, p. 466; latency stage, p. 467; genital stage, p. 467; Freudian slips, p. 468	• According to Freud, three distinct levels of consciousness exist; the conscious, preconscious, and unconscious. Freud contended that personality consists of three basic parts: id, ego, and superego, which correspond roughly to desire, reason, and conscience. • Freud believed that all human beings move through a series of psychosexual stages during which the id's search for pleasure is focused on different regions of the body. Too much or too little gratification at any of these stages can result in fixation and, later, in psychological disorders.
Other Psychoanalytic Views Key Terms: neo-Freudians, p. 471; collective unconscious, p. 471; archetypes, p. 471; animus, p. 471; anima, p. 471; introverts, p. 471; extroverts, p. 471; striving for superiority, p. 474	• Jung believed that all human beings share a collective unconscious: memories and images that strongly influence our perceptions of the world and behavior. • Horney rejected Freud's suggestion that females experience penis envy. She contended that many psychological disorders stem from social factors rather than from fixation at various stages of psychosexual development. • Adler believed that human beings experience strong feelings of inferiority during early life and must struggle to overcome these through compensation. He also emphasized the influence of social factors such as birth order and family constellation in the formation of adult personality.
Humanistic Theories Key Terms: humanistic theories, p. 475; fully functioning persons, p. 476; self-concept, p. 476; unconditional positive regard, p. 477; self-actualization, p. 477; peak experiences, p. 477; self-disclosure, p. 478	• Humanistic theories of personality take a more optimistic view of human nature than psychoanalytic theory, suggesting that human beings strive for personal development and growth, not just satisfaction of biological needs. • According to Rogers, all human beings possess the capacity to become fully-functioning persons. Often, they do not reach this stage because distorted self-concepts interfere with personal growth. • Maslow suggests that when lower-level needs are met, human beings strive to attain self-actualization—to become the best persons they can be. • Self-disclosure, revealing our inner thoughts to others, can have beneficial effects on our health and well-being.
Trait Theories Key Terms: personality traits, p. 480; trait theories, p. 480; secondary traits, p. 481;	• Allport suggested that human beings possess a small number of central traits that account for much of their uniqueness as individuals. Cattell has identified sixteen source traits that, he believes, underlie differences between individuals on many specific dimensions.

central traits, p. 481; cardinal trait, p. 481; functional autonomy, p. 481; source traits, p. 481; extraversion, p. 482; agreeableness, p. 482; conscientiousness, p. 482; emotional stability, p. 482; openness to experience, p. 482	• Research findings point to the conclusion that there are only five basic dimensions of personality: extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience.
Learning Approaches to Personality Key Terms: social cognitive theory, p. 485; self-reinforcement, p. 485; self-efficacy, p. 485; internals, p. 486; externals, p. 486	• Learning approaches to personality suggest that personality is strongly influenced by learning and experience. Early learning theories denied the importance of internal factors such as goals and expectancies. • More modern learning approaches, such as Bandura's social cognitive theory, assume that behavior is influenced by cognitive factors and personal dispositions as well as by reinforcement contingencies and the social and physical environment. Rotter's social learning approach calls attention to the importance of generalized expectancies concerning the internal or external control of outcomes.
Key Aspects of Personality Key Terms: self-esteem, p. 488; self-monitoring, p. 490; sensation seeking, p. 492	• Persons high in self-esteem are generally happier, healthier, and more successful at many tasks than persons low in self-esteem. They also have more consistent and well-developed self-concepts. However, under conditions involving ego threat, persons high in self-esteem may experience larger decrements in performance than those low in self-esteem. • High self-monitors are better at reading others and better at making favorable impressions on them. Low self-monitors, in contrast, show more consistent behavior across situations. High self-monitors are more successful at social deception than low-self-monitors, partly because they are better at regulating their own expressive behavior. • High sensation-seekers like higher levels of arousal than low sensation-seekers, show stronger orienting responses, are better able to focus their attention on new stimuli, and are better able to handle stressful life events.

Critical Thinking Questions

Appraisal	Some would say that people differ in so many ways that it is impossible ever to obtain solid, scientific understanding of personality. Do you agree or disagree? Why?
Controversy	Growing evidence indicates that some aspects of personality, like some aspects of physical appearance, are influenced by genetic factors. Does this mean that personality, like eye color or height, is predetermined and can't be changed? Or, even if genetic factors *do* play a role, do you think that personality remains open to change throughout life?
Making Psychology Part of Your Life	Different jobs or careers seem to require different traits for their successful performance. For example, a timid, shy person would probably *not* be successful as an emergency-room physician or as a politician. What kind of jobs or careers do you think might provide a good match to *your* personality? Why? Do you think that taking careful account of your own traits and dispositions might help you to choose the right career?

Health, Stress, and Coping

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13

Imagine that you've been granted three wishes. How will you use them? Will you request fame and power? Immense wealth? Irresistible charm or beauty? Obviously, the possibilities are endless. But what about good health—will this be among your choices? For many people, especially young people, the answer is probably no. In one sense, this is somewhat surprising, for without good health it would be impossible for you to enjoy the benefits you gained from your other wishes.

Fortunately, over the past several decades, a growing number of people all over the world have become increasingly aware of

the importance of good health and the value of taking active steps to ensure it Many of us are trying to eat healthier foods, to refrain from smoking, to drink alcohol only in moderation, and to engage in regular physical exercise. Psychologists, too, have become increasingly interested in the issue of personal health and have made it the focus of a growing volume of research. This certainly seems appropriate. After all, mental health has always been a central topic in psychology, and it is increasingly clear that mental and physical health are intimately linked.

A GROWING NUMBER OF PEOPLE HAVE BECOME INCREASINGLY AWARE OF THE IMPORTANCE OF GOOD HEALTH AND THE VALUE OF TAKING ACTIVE STEPS TO ENSURE IT.

As a case in point, consider an example from my own life: the different ways in which members of my own family reacted to a critical health-related event. The event was the news that my grandfather had developed a serious form of cancer. Curiously, the person least affected by the diagnosis was my grandfather himself; he remained calm and collected, despite the implications for him personally. Why? Because, as he told me, he felt that he had done his part; he had done everything he could to stay healthy. In contrast, my grandmother took the news badly—but not just because of the discovery of the illness. Shortly before the examination in which doctors detected the cancer, she had given my grandfather a hard time about wasting time and money getting annual checkups. In particular, she felt that he paid too many visits to his lifelong friend Herb, who also happened to be his personal physician. Each time he went for one of these check-ups, she had complained, Herb would tell him the same thing: "Good news, you're the picture of health—see you next time." Now, the uncertainty of my grandfather's future, coupled with the guilt she felt over her earlier behavior, weighed heavily on my grandmother's conscience. The result: *she* became physically ill and remained that way for several months.

INDIVIDUAL DIFFERENCES IN REACTIONS TO STRESS AND ILLNESS

It is often difficult to predict how people will react to bad news, such as learning that a family member or friend has a life-threatening illness. Sometimes the stress caused by these events can even lead to the development of a physical illness.

The story has a happy ending, however. The cancer was detected at an early stage and treated successfully. Apparently my grandfather's faithful adherence to annual medical checkups, his careful attention to diet and exercise, and his positive outlook on life paid off. My grandmother, too, regained her former resilience, although it is interesting to note that her return to health occurred gradually and seemed to mirror my grandfather's recovery. Both of them went on to many more years of happy, fulfilling life, and my grandfather's cancer never recurred.

In this chapter we'll explore important ways in which our increasing knowledge of important mind-body interactions can be applied to promote health and wellness. We'll begin by considering the exciting new branch of psychology known as *health psychology*. The primary aim of health psychology is to determine important relationships between psychological variables and health (Gatchel, Baum, & Krantz, 1989; Matarazzo, 1980). Second, we'll consider the nature of *stress*, a major health-related problem in the hectic 1990s. We'll focus on both the causes of stress and some of its major effects—how it influences health and performance. In addition, we'll examine recent evidence regarding the short- and long-term effects of *environmental stressors*, such as the floods that devastated large areas of the midwestern United States in 1993. Next, we'll consider how some of our *beliefs and attitudes* influence the way in which we interpret certain health symptoms, and thus affect our willingness to seek necessary medical assistance. Fourth, we'll look at *behaviors* that can directly affect our risk of contracting certain lifestyle-related illnesses, such as cancer, cardiovascular diseases, and AIDS. Finally, we'll consider various ways in which psychologists work to promote personal health by encouraging healthy lifestyles.

HEALTH PSYCHOLOGY: An Overview

Health psychology, the branch of psychology that studies the relation between psychological variables and health, reflects the view that both mind and body are important determinants of health and illness (Feuerstein, Labbe, & Kuczmierczyk, 1986). Specifically, health psychologists believe that our beliefs, attitudes, and behavior contribute significantly to the onset or prevention of illness (Engel, 1980). A closely related field, known as *behavioral medicine,* combines behavioral and biomedical knowledge for the prevention and treatment of disorders ordinarily thought of as being within the domain of medicine (Epstein, 1992).

Health psychology and behavioral medicine have experienced tremendous growth since their beginnings in the early 1970s. Perhaps the most fundamental reason for the increased interest in health psychology and behavioral medicine is the dramatic shift observed in the leading causes of death throughout the world during this century. In 1900, many of the leading causes of death could be traced to infectious diseases, such as influenza and pneumonia, tuberculosis, nephritis, and diphtheria (see Figure 13.1 on page 502). However, because of advances in medical technology and a greater focus on prevention, only five of the ten leading causes of death in 1900 were still among the top ten in 1988.

Interestingly, most of the current leading causes of premature death can be attributed to characteristics that make up **lifestyle**: the overall pattern of decisions and behaviors that determines a person's health and quality of life (Lalonde, 1974). This fact suggests that psychologists, now more than ever, can make a difference in people's quality of life by helping them to eliminate behaviors that lead to illness and to adopt behaviors that lead to wellness. Indeed, a majority of the conditions that now constitute the leading causes of death (as illustrated in Figure 13.1) could be prevented if people would simply eat healthier foods, reduce alcohol consumption, practice safe sex, eliminate smoking, and exercise regularly. One encouraging piece of information is that during the 1980s declines occurred in the death rates from lifestyle-related causes, with the exception of deaths from smoking (U.S. Department of Health and Human Services, 1991).

A dramatic example of the impact of behavior on health was observed in a classic decade-long research project conducted in Alameda County, California (Wiley & Camacho, 1980). Adult participants were asked whether they followed certain health practices, including sleeping seven to eight hours each night, eating breakfast regularly, refraining from smoking, drinking alcohol in moderation or not at all, maintaining their weight within normal limits, and exercising regularly. Interestingly, participants who reported practicing all or most of these behaviors were much less likely to die during the study period than those who practiced few or none of these behaviors. Although these results are based on correlations and are therefore not conclusive, they do suggest a relationship between our lifestyle and our life span. Indeed, in the United States lifestyles contribute to a significant proportion of premature deaths (those that occur before age sixty-five)—in fact more than half.

KEY POINTS

- The primary aim of health psychology is to determine important relationships between psychological variables and health.
- A related field, behavioral medicine, combines behavioral and biomedical science knowledge to prevent and treat disorders.
- Many of today's leading causes of premature death can be attributed to people's lifestyles.

Health Psychology: *The study of the relation between psychological variables and health; reflects the view that both mind and body are important determinants of health and illness.*

Lifestyle: *In the context of health psychology, the overall pattern of decisions and behaviors that determine health and quality of life.*

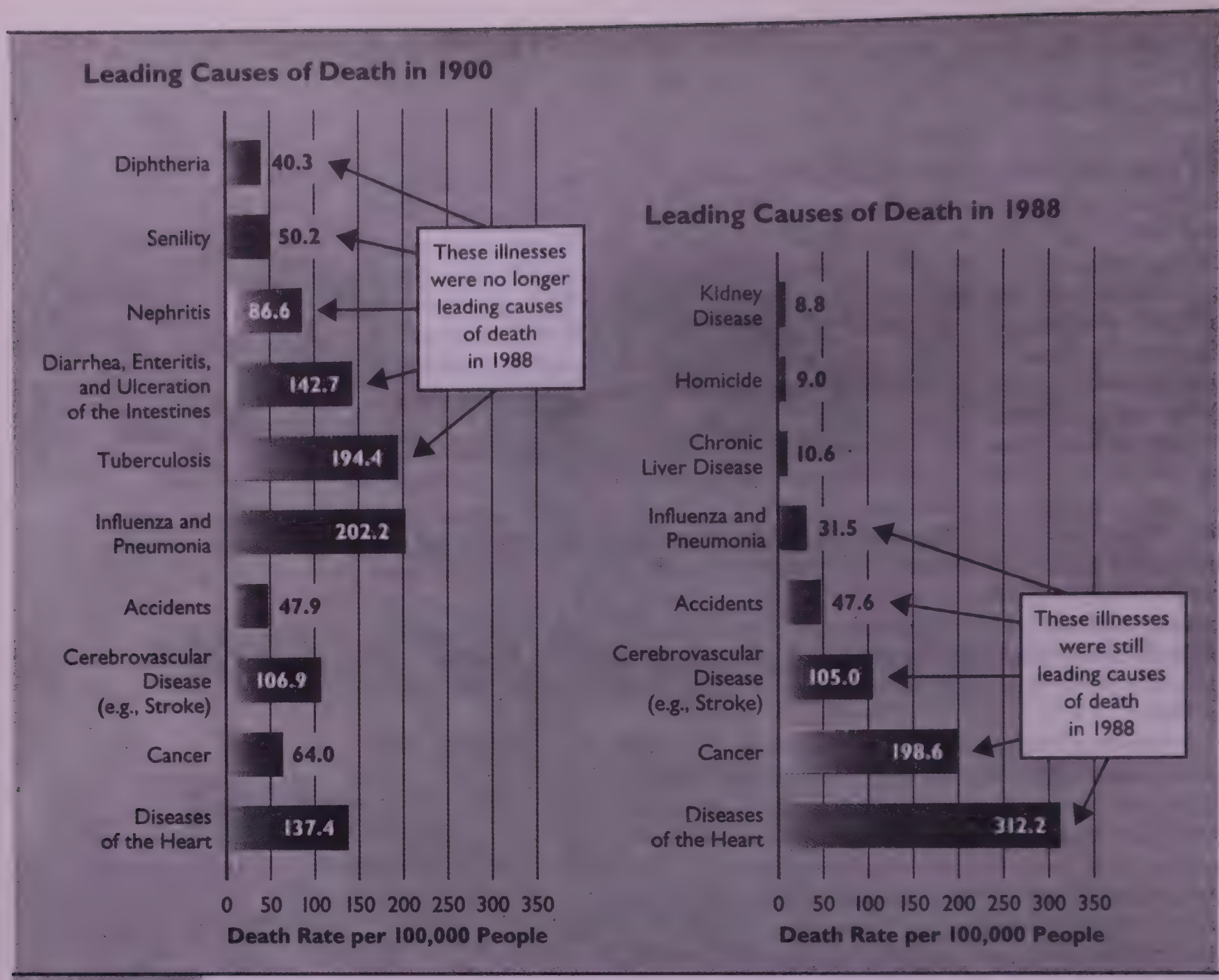


FIGURE 13.1

Leading Causes of Death in the United States

The leading causes of death in the United States in 1900 (left) compared with those in 1988 (right).
(*Source:* Based on data from Wiley & Camacho, 1980, and the National Center for Health Statistics, 1988.)

Another important finding that has contributed to the rapid development of health psychology and behavioral medicine is the evidence that lifestyle factors that can be described as stressful can have adverse effects on our physical health. Let's turn now to the nature and causes of stress.

STRESS: Its Causes, Effects, and Control

As described earlier, the news of my grandfather's cancer affected each of my grandparents quite differently. My grandfather remained surprisingly unaffected, while my grandmother couldn't cope with the possible outcomes

and in fact became very sick shortly after the diagnosis. Have you ever felt this way—felt that you were right at the edge of being overwhelmed by negative events in your life? Or felt so overwhelmed that you just gave up? If so, you are already quite familiar with **stress**: our response to events that disrupt, or threaten to disrupt, our physical or psychological functioning (Lazarus & Folkman, 1984; Taylor, 1991). Unfortunately, stress is a common part of life in the 1990s—something few of us can avoid altogether. Partly for this reason, and partly because it seems to exert negative effects on both physical health and psychological well-being, stress has become an important topic of research in psychology. Let's examine the basic nature of stress and some of its major causes.

Stress: Its Basic Nature

Stress is a many-faceted process that occurs in reaction to events or situations in our environment termed **stressors**. An interesting feature of stress is the wide range of physical and psychological reactions that different people have to the same event; some may interpret an event as stressful, whereas others simply take it in stride. Moreover, a particular person may react quite differently to the same stressor at different points in time.

Stressors: The Activators of Stress What are stressors? Although we normally think of stress as stemming from negative events in our lives, positive events such as getting married or receiving an unexpected job promotion can also produce stress (Brown & McGill, 1989). Despite the wide range of stimuli that can potentially produce stress, it appears that many events we find stressful share several characteristics: (1) They are so intense, in some respect, that they produce a state of overload—we can no longer adapt to them. (2) They evoke incompatible tendencies in us, such as tendencies both to approach and to avoid some object or activity. (3) They are uncontrollable—beyond our limits of control. Indeed, a great deal of evidence suggests that when people can predict, control, or terminate an aversive event or situation, they perceive it to be less stressful than when they feel less in control (Karasek & Theorell, 1990; Rodin & Salovey, 1989).

Physiological Responses to Stressors When exposed to stressors in our environment, we generally experience many physiological reactions. If you've been caught off-guard by someone who appears out of nowhere and grabs you while screaming "Gotcha," then you are probably familiar with some common physical reactions to stress. Initially, your blood pressure soars, your pulse races, and you may even begin to sweat. These are part of a general pattern of reactions referred to as the *fight-or-flight syndrome*, a process controlled through the sympathetic nervous system. As we saw in chapter 2, the sympathetic nervous system prepares our bodies for immediate action. Usually these responses are brief, and we soon return to normal levels. When we are exposed to chronic sources of stress, however, this reaction is only the first in a longer sequence of responses activated by our efforts to adapt to a stressor. This sequence, termed by Hans Selye (1976) the **general adaptation syndrome (GAS)**, consists of three stages.

As shown in Figure 13.2 (on page 504), the first is the *alarm* stage, in which the body prepares itself for immediate action; arousal of the sympathetic nervous system releases hormones that help prepare our body to meet threats or dangers (Selye, 1976). If stress is prolonged, however, the *resistance* stage begins. During this second stage, arousal is lower than during the alarm stage, but our bodies continue to draw on resources at an above-normal rate

Stress: *The process that occurs in response to events that disrupt, or threaten to disrupt, our physical or psychological functioning.*

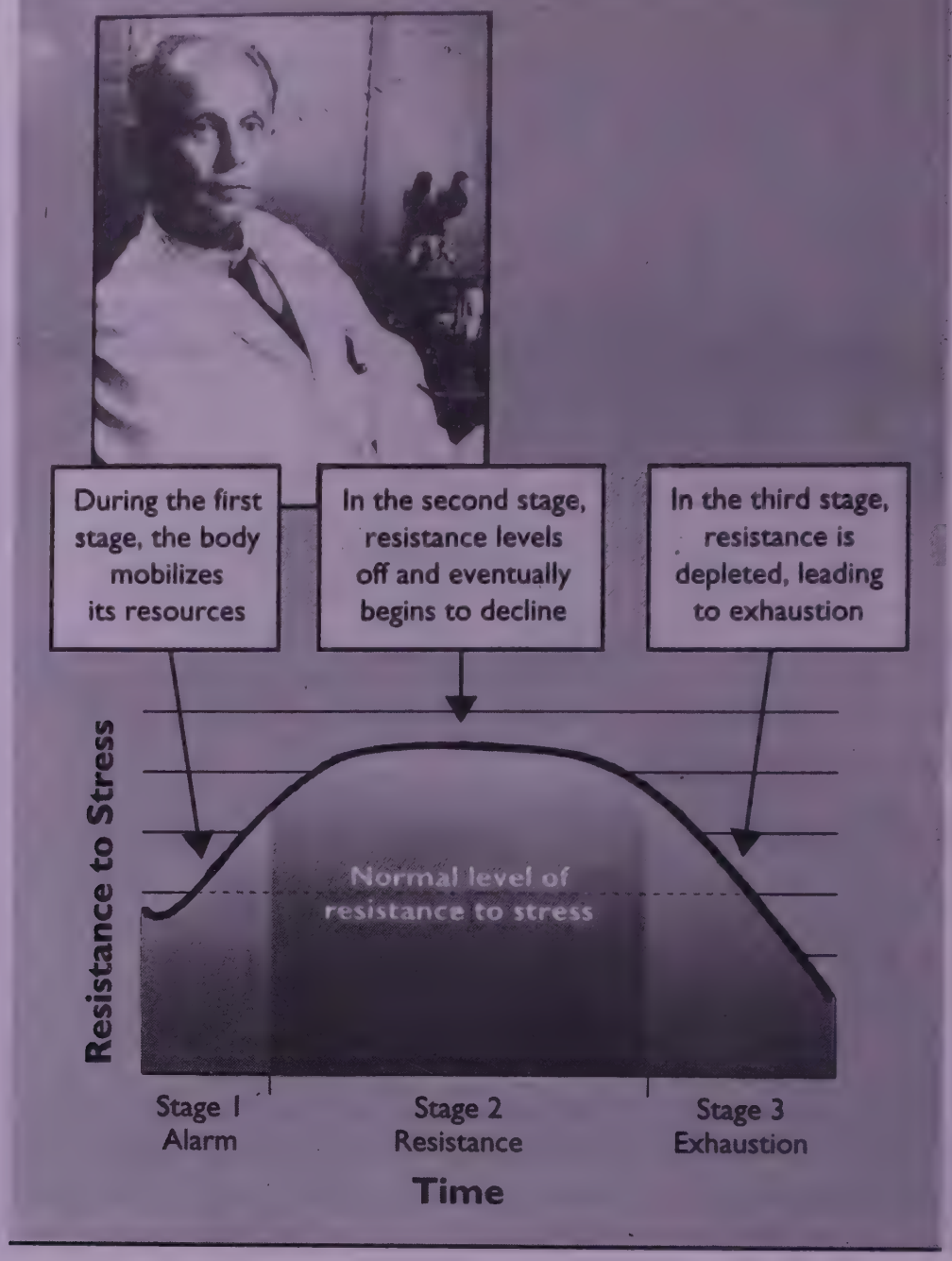
Stressors: *Events or situations in our environment that cause stress.*

General Adaptation Syndrome (GAS): *A three-phase model of how organisms respond to stress: (1) alarm or mobilization, (2) resistance, and (3) exhaustion.*

FIGURE 13.2

Selye's General Adaptation Syndrome

According to Hans Selye (shown here), the body's reaction to prolonged stress progresses through three stages: alarm, resistance, and, finally, exhaustion.



in order to cope effectively with the stressor. Continued exposure to the same stressor or additional stressors drains the body of its resources and leads to the third stage, *exhaustion* (please refer to Figure 13.2). During this stage our capacity to resist is depleted, and our susceptibility to illness increases. In severe cases of prolonged physical stress, the result can be death.

Cognitive Appraisal of Our Stressors Selye's general adaptation syndrome provides a framework for understanding our physiological responses to stressful events and suggests at least one reasonable explanation for the relation between stress and illness. Indeed, few experts would disagree that chronic stress can lead to a lowered resistance to disease. However, a critical weakness with Selye's model is that it fails to consider the importance of cognitive processes in determining whether we interpret a specific event as stressful. The importance of these processes is made clear by the following fact: When confronted with the same potentially stress-inducing situation, some persons experience stress, whereas others do not. Why? One reason involves individuals' cognitive appraisals (Figure 13.3). In simple terms, stress occurs only to the extent that the persons involved perceive (1) that the situation is somehow threatening to their important goals (often described as

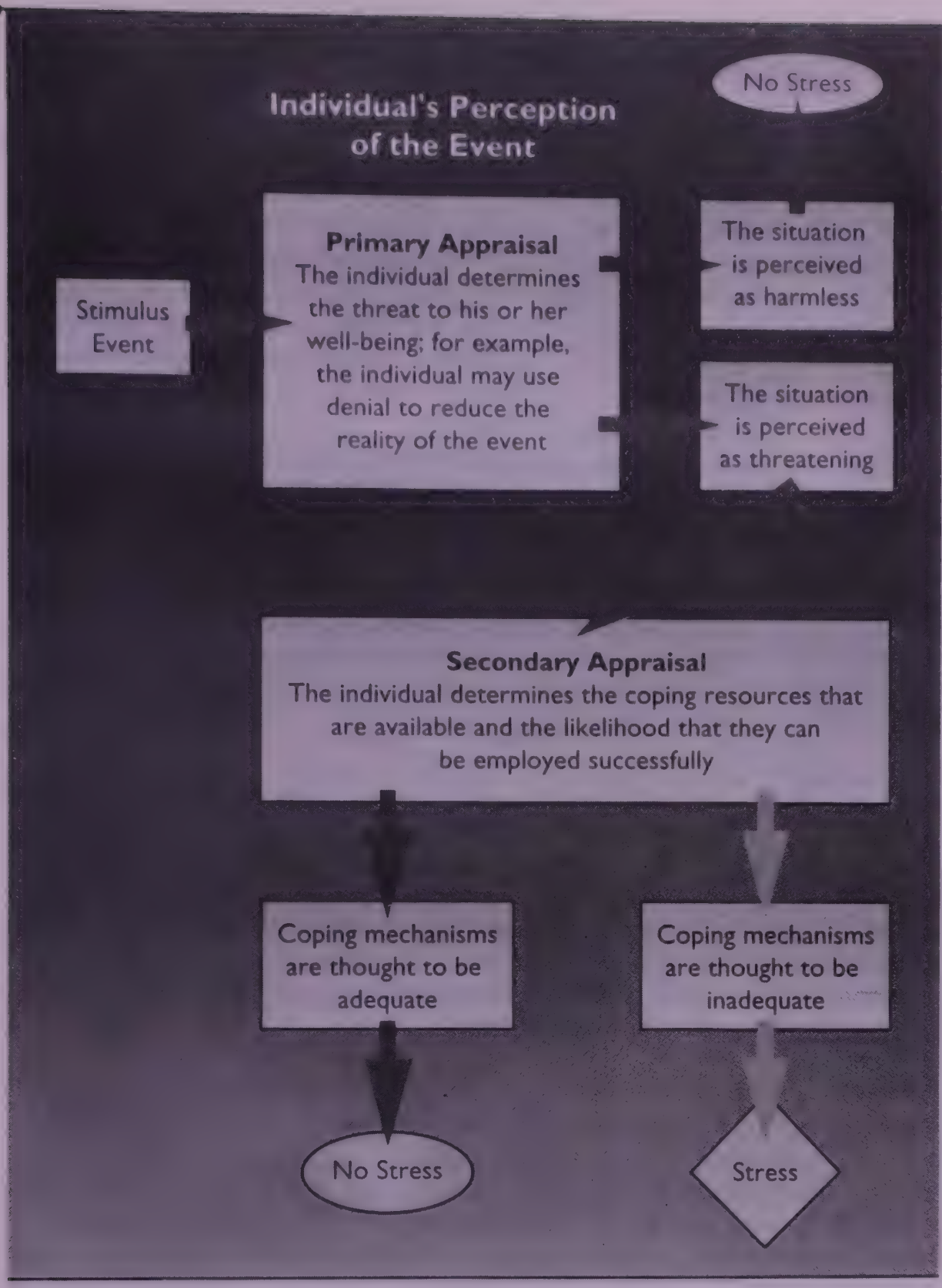


FIGURE 13.3

Stress: The Role of Cognitive Appraisals

The amount of stress you experience depends in part on your cognitive appraisals of the event or situation—the extent to which you perceive it as threatening and perceive that you will be unable to cope with it.
(*Source:* Based on data from Hingson et al., 1990.)

primary appraisal) and (2) that they will be unable to cope with these dangers or demands (often described as *secondary appraisal)* (Croyle, 1992; Lazarus & Folkman, 1984).

An example will illustrate this point. Let's consider a recent study of the cognitive appraisal process by Tomaka and his colleagues (1993). Participants in this study were initially told that the researchers were interested in measuring their physiological responses (heart rate, pulse) while they performed a mental task: counting backward from the value 2,737 by sevens—that is, 2,730, 2,723, 2,716, and so on. The participants were instructed to perform the activity as quickly and as accurately as possible. Just before they began, the researchers assessed participants' primary and secondary appraisals of the task. They assessed primary appraisals by asking them, "How threatening do you expect the upcoming task to be?" They assessed secondary appraisals by asking, "How able are you to cope with this task?" The researchers predicted

that persons who felt they could not successfully perform the task would perceive it as threatening ("threat group") and would therefore experience stress. In contrast, they reasoned, persons who were more confident in their abilities might perceive the task as a challenge ("challenge group"); while these persons would not experience stress, they would in fact exhibit greater physiological arousal as they prepared to meet the challenge. All predictions were confirmed. Participants in the threat group reported *feeling* greater stress, while participants in the challenge group actually showed greater physiological arousal. Moreover, the challenge group scored higher on both perceived and actual measures of performance. The **Key Concept** page provides an overview of both the physical and cognitive aspects of stress.

Additional research suggests that other cognitive factors also play a role in our interpretation of potentially stressful events, including the reactions of those around us and the extent of our experience in similar situations (Mendolia & Kleck, 1993; Tomaka et al., 1993). In short, these results and the results of related research provide evidence for the important role of cognitive and social processes in shaping our response to the stressors in our environment. We'll turn next to some of the causes of stress.

KEY POINTS

- Stress is the process that occurs in response to situations or events (stressors) that disrupt, or threaten to disrupt, our physical or psychological functioning.
- The GAS model of our physiological reactions to stressors includes three stages: alarm, resistance, and exhaustion.
- Cognitive appraisals play an important role in determining whether an event will be interpreted as stressful or as a challenge.

STRESS: Some Major Causes

What factors contribute to stress? Unfortunately, the list is a long one. A wide range of conditions and events seem capable of generating such feelings. Among the most important of these are major stressful life events, such as the death of a loved one or a painful divorce; the all-too-frequent minor hassles of everyday life; conditions and events relating to one's job or career; and certain aspects of the physical environment.

STRESSFUL LIFE EVENTS Death of a spouse, injury to one's child, war, failure in school or at work, an unplanned pregnancy—unless we lead truly charmed lives, most of us experience traumatic events and changes at some time or other. What are their effects on us? This question was first investigated by Holmes and Rahe (1967), who asked a large group of persons to assign arbitrary points (to a maximum of one hundred) to various life events according to how much readjustment each had required. It was reasoned that the greater the number of points assigned to a given event, the more stressful it was for the persons experiencing it.

As you can see from Table 13.1 (on page 508), participants in Holmes and Rahe's study assigned the greatest number of points to such serious events as death of a spouse, divorce, and marital separation. In contrast, they assigned much smaller values to such events as change in residence, vacation, and minor violations of the law, such as a parking ticket.

Holmes and Rahe (1967) then related the total number of points accumulated by individuals during a single year to changes in their personal health. The results were dramatic—and did much to stir psychologists' interest in the effects of stress. The greater the number of "stress points" people accumulated, the greater was their likelihood of becoming seriously ill. For example, Cohen, Tyrrell, and Smith (1993) asked a group of volunteers to report all significant stressful events that had affected them negatively during the previous twelve months. Then the researchers gave these persons nose drops containing a virus known to cause the common cold. A control group re-

Key Concept

The Two Sides of Stress

The Physical Side of Stress

Selye's *GAS model* provides a framework for understanding how stress affects us physically.

Stage 1

During the *alarm stage* the body prepares itself for immediate action (increased heart rate, blood pressure, and energy consumption).

Stage 2

During the *resistance stage* the body draws on resources at an above-normal rate to cope with a prolonged stressor.

Stage 3

During the *exhaustion stage* the body's capacity to cope with stress is depleted and susceptibility to illness increases dramatically.

After finishing a race, long-distance runners may find themselves in the *exhaustion stage* of Selye's GAS model: They have totally drained their body's capacity to cope with stress.

If we interpret an event, such as news conveyed in a letter, as threatening, it will tend to be more stressful than if we interpret the same event as nonthreatening.

The Cognitive Side of Stress

The *cognitive appraisal model* illustrates how our interpretation of potentially stressful events greatly affects our reactions to them.

Primary appraisal addresses the following question: How threatening is a potentially stressful event?

- If the event is not perceived as threatening, then we experience no stress.
- If the event is perceived as threatening, then we engage in secondary appraisal of the situation.

Secondary appraisal addresses the following question: Given that an event is viewed as a threat, do we have the resources to cope with it effectively?

- If the answer is yes, we do not experience stress.
- If the answer is no, we experience stress.

TABLE 13.1

Life Events, Stress, and Personal Health

When individuals experience stressful life events, such as those near the top of this list, their health often suffers. The greater the number of points for each event, the more stressful it is perceived as being.
(*Source:* Based on data from Holmes & Masuda, 1974.)

Rank	Life Event	Life Change Unit Value
1	Death of spouse	100
2	Divorce	73
3	Marital separation	65
4	Jail term	63
5	Death of close family member	63
6	Personal injury or illness	53
7	Marriage	50
8	Getting fired at work	47
9	Marital reconciliation	45
10	Retirement	45
11	Change in health of family member	44
12	Pregnancy	40
13	Sex difficulties	39
14	Gain of new family member	39
15	Business readjustment	39
16	Change in financial state	38
17	Death of close friend	37
18	Change to different line of work	36
19	Change in number of arguments with spouse	35
20	Taking out mortgage for major purchase (e.g., home)	31
21	Foreclosure of mortgage or loan	30
22	Change in responsibilities at work	29
23	Son or daughter leaving home	29
24	Trouble with in-laws	29
25	Outstanding personal achievement	28
26	Wife beginning or stopping work	26
27	Beginning or ending school	26
28	Change in living conditions	25
29	Revision of personal habits	24
30	Trouble with boss	23
31	Change in work hours or conditions	20
32	Change in residence	20
33	Change in schools	20
34	Change in recreation	19
35	Change in church activities	19
36	Change in social activities	18
37	Taking out a loan for a lesser purchase (e.g., car or TV)	17
38	Change in sleeping habits	16
39	Change in number of family get-togethers	15
40	Change in eating habits	15
41	Vacation	13
42	Christmas	12
43	Minor violation of the law	11

ceived uncontaminated nose drops. The results? Volunteers who reported two or more negative life events during the previous year and felt that they were under a lot of stress were more likely to develop a cold than less-stressed volunteers who had experienced fewer than two negative life events.

This picture is complicated, however, by the existence of large differences in individuals' ability to withstand the impact of stress (Oulette-Kobasa & Puccetti, 1983). While some persons suffer ill effects after exposure to a few

mildly stressful events, others remain healthy even after prolonged exposure to high levels of stress; they are described as being *stress-resistant* or *hardy*. I'll return to such differences later in this chapter. For the moment, I wish merely to emphasize the fact that in general, the greater the number of stressful life events experienced by an individual, the greater the likelihood that the person's subsequent health will be adversely affected (Rowlison & Felner, 1988).

The Hassles of Daily Life While certain events, such as the death of someone close to us, are clearly stressful, they occur relatively infrequently. Does this mean that people's lives are mostly a serene lake of tranquility? Hardly. As you know, daily life is filled with countless minor sources of stress that seem to make up for their relatively low intensity by their much higher frequency. That such daily hassles are an important cause of stress is suggested by the findings of several studies by Lazarus and his colleagues (DeLongis, Folkman, & Lazarus, 1988; Kanner et al., 1981; Lazarus et al., 1985). These researchers have developed a Hassles Scale on which individuals indicate the extent to which they have been "hassled" by common events during the past month. The items included in this scale deal with a wide range of everyday events, such as having too many things to do at once, shopping, and concerns over money. While such events may seem relatively minor when compared with the life changes studied by Holmes and Rahe (1967), they appear to be quite important. When scores on the Hassles Scale are related to reports of psychological symptoms, strong positive correlations are obtained (Lazarus et al., 1985). In short, the more stress people report as a result of daily hassles, the poorer their psychological well-being.

And such effects may also apply to physical health as well, as indicated by a study conducted by Williams, Zyzanski, and Wright (1992). These researchers asked Navajo patients at a U.S. Indian Health Service facility about major life events during the preceding six months and about the daily hassles and "uplifts" (pleasant experiences) they'd experienced during the previous week. The measures were designed to include culturally relevant measures of daily irritation or satisfaction. Two years later, the researchers reviewed each participant's medical chart to determine the number of inpatient admissions and outpatient visits that had occurred. Consistent with the researchers' predictions, increased numbers of major life events and daily hassles, or an excess of hassles compared to uplifts, were associated with an increased risk of hospitalization during the two-year period. Additionally, participants' daily hassles scores predicted how frequently they used outpatient services during this time period.

These results, combined with those of previous studies, suggest the following possibility. Major life events can exert adverse effects on health; but for many persons, the more minor hassles of everyday life—perhaps because of their frequent, repetitive nature—may actually prove even more important in this respect.

Daily Hassles as a Source of Stress

Many everyday hassles are stressful. Would you experience stress in the situation shown here?

Environmental Sources of Stress Have you ever experienced a flood—such as the one that devastated the midwestern United States in 1993? Lived through an earthquake—like the one that rocked Los Angeles in 1994? Even if you didn't experience these or other disasters directly, you've probably witnessed on television the scope of destruction resulting from each of these events. If so, you can no doubt appreciate that such natural events or disasters can be highly stressful. Until recently, catastrophic environmental events were not studied systematically, because of their infrequent and unpredictable occurrence (Solomon & Maser, 1990). However, because the survivors of these devastating events often experience the severe psychological

aftermath termed **posttraumatic stress disorder** (see chapter 14), psychologists have taken a renewed interest in studying them (Kaniasty & Norris, 1993; Kasl, 1990). Commonly reported psychological problems that follow large-scale disasters include nightmares and flashbacks, distress at exposure to reminders of the event, irritability, difficulty concentrating, and a general unresponsiveness (Lindy, Green, & Grace, 1987).

Whether large-scale natural disasters produce lasting psychological effects, however, remains a source of controversy. Some research shows evidence of long-term psychological effects, whereas other studies show that the psychological impact of natural disasters is minimal. The most common finding is mild, transient distress that subsides soon after the visible effects of the disaster are no longer apparent (Bravo et al., 1990). Recent evidence suggests that the disparities among these findings may be attributable to the indirect effects of natural disasters—most importantly, the extent to which disaster victims experience deterioration in the amount and availability of social support from their friends, family, and community (Kaniasty & Norris, 1993; Norris & Uhl, 1993). In other words, persons experiencing many forms of stress can usually expect to receive support from one or more of these resources. Unfortunately, large-scale disasters often impact entire communities. As a result, important sources of social support are virtually eliminated, which, in turn, sharply reduces their potential buffering effects.

Human-produced disasters, such as the meltdown of the Chernobyl nuclear reactor in the former Soviet Union, can also exert such effects. And in certain respects, the psychological trauma that results from human-produced disasters can be more dramatic and long-term in its scope (Baum & Fleming, 1993). Why should this be so? Several factors seem to play a role. One important factor appears to be control. Human-produced disasters are usually the result of human error; but we expect that adequate precautions will be taken to prevent human error. Thus, when disaster strikes, our expectations are violated, leading to a sense of loss of control. In contrast, we do not expect to have control over hurricanes, earthquakes, or other types of natural disasters.

A second factor has to do with the consequences associated with each type of disaster. Natural disasters, while large in scope, tend to be clearly marked and limited in time. In contrast, human-produced disasters—such as the contamination of groundwater with toxic chemicals—can potentially exert their effects for many years. For example, exposure to toxic chemicals can increase people's risk of developing cancer or produce genetic damage (Vaughan, 1993). Moreover, the psychological trauma combined with the uncertainty regarding when or if these consequences will appear can produce chronic stress-related problems. Consider what happened when the nuclear reactor at Three-Mile Island in Pennsylvania released small amounts of radioactivity into the environment in March 1979. People living nearby reported much higher levels of stress than those living far away. More impor-

POSTTRAUMATIC STRESS AND THE CHILDREN OF CHERNOBYL

The psychological trauma that results from human-produced disasters can be more devastating than that resulting from natural disasters.

Posttraumatic Stress Disorder: *Psychological disorder resulting from a very stressful experience; includes nightmares and flashbacks, distress at exposure to reminders of the event, irritability, difficulty concentrating, and a general unresponsiveness.*

tantly, however, these effects were still evident six years later (Gatchel, Schaeffer, & Baum, 1985). Similar outcomes have been observed for accidents involving toxic chemicals (Baum & Fleming, 1993).

Work-Related Stress Most adults spend more time at work than in any other single activity. It is not surprising, then, that jobs or careers are a central source of stress. Some of the factors producing stress in work settings are obvious; for example, blatant sexual harassment or discrimination, or extreme *overload*—being asked to do too much in too short a time. Interestingly, being asked to do too little can also cause stress. Such *underload* produces intense feelings of boredom, and these, in turn, can be very stressful.

Several other factors that play a role in work-related stress may be less apparent. One of these is *role conflict*—being the target of conflicting demands or expectations from different groups of people. For example, consider the plight of many first-line managers. Their subordinates often expect such persons to go to bat for them with the company to improve their work assignments, pay, and conditions. In contrast, the managers' own bosses often expect them to do the opposite: somehow to induce the employees to work harder for fewer rewards. The result: a stressful situation for the managers.

Another work-related factor that can sometimes generate intense levels of stress involves *performance appraisals,* the procedures used for evaluating employees' performance. If employees perceive these as fair, employee stress tends to be low; if employees view them as arbitrary or unfair, it is almost certain to be high. After all, no one wants to feel that rewards such as raises, promotions, or bonuses are being distributed in an unjust manner.

Work-related issues are of great interest to experts in a branch of psychology called industrial/organizational psychology, and we'll consider these issues in greater detail in chapter 17. Additional factors that have been found to contribute to stress at work are summarized in Figure 13.4. Please examine them carefully, for you are certain to encounter several in your own job and career. And for more information on what can be done to combat the effects of stress in the workplace, see the **Point of It All** section on pages 512–513.

Key Points

- Stressors can be major life events, such as the death of a spouse, or daily minor hassles.
- Survivors of devastating natural and human-produced events often experience severe psychological problems, termed posttraumatic stress disorder.
- Among sources of work-related stress are work overload and underload, role conflict, and performance appraisals.

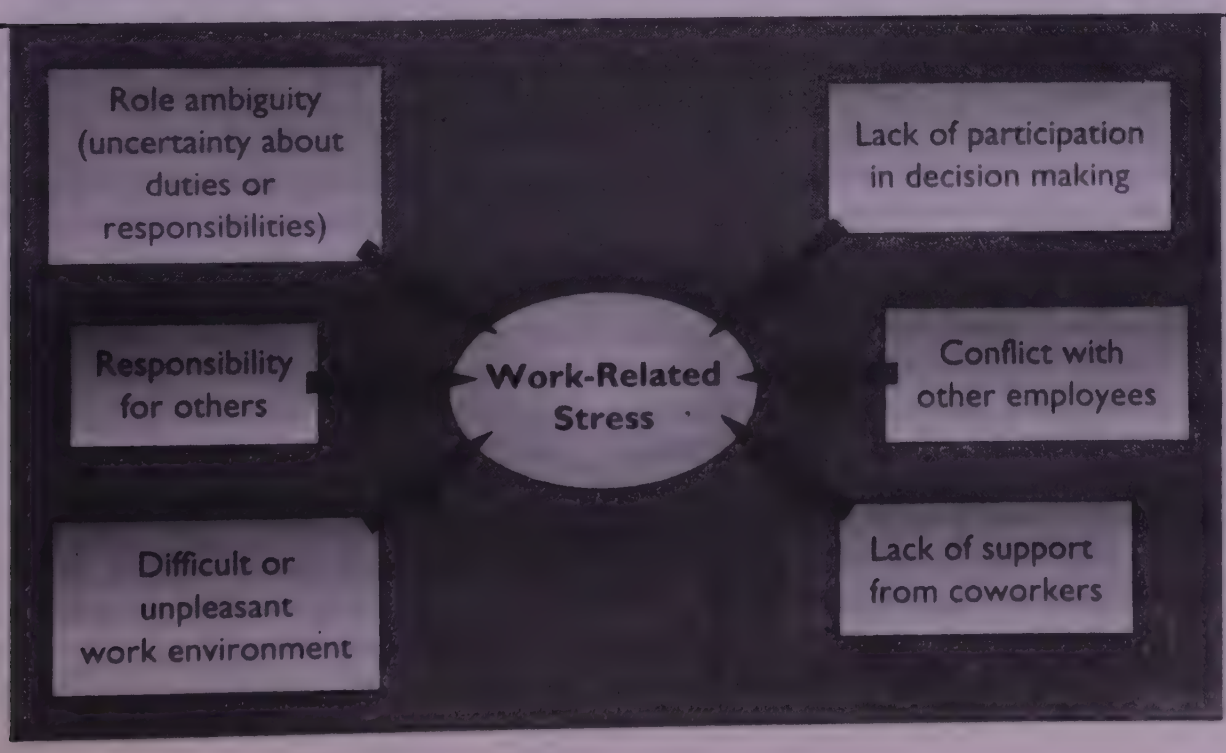


Figure 13.4

Sources of Work-Related Stress

Many factors contribute to stress at work. Several of the most important are summarized here.

The Point of It All

Putting Psychology to Work: Reducing Stress in the Workplace

As I've already pointed out, many aspects of the workplace can be potential sources of stress. Moreover, a stressful working environment can lead to the development of psychological and physical problems or contribute to a worsening of existing health problems. Can anything be done to reduce such effects? Fortunately, the results of several lines of research suggest the answer is yes.

First, employers can help reduce stress in the workplace by considering the **person-environment (P-E) fit** (Edwards & Harrison, 1993). Growing evidence suggests that "misfits" between characteristics of workers and characteristics of their jobs or work environments are associated with a host of negative outcomes, including psychological disturbances, job dissatisfaction, and increases in stress and stress-related illnesses (Harrison, 1985). For example, consider the potential negative outcomes that might result from placing persons with a low tolerance for anxiety into high-pressure work environments or assigning persons who require variety and challenge to jobs consisting of simple repetitive tasks. Employers can often reduce stress in the workplace by incorporating the idea of P-E fit into their selection procedures. In other words, employers can minimize the potential for P-E "misfits"—and thereby reduce the potential for creating stressful situations—by hiring workers with characteristics that closely match the demands of the job for which they are being considered (Landsbergis et al., 1992).

Second, research suggests that the amount and availability of social support, both on and off the job, is also a crucial determinant of workplace stress (Cohen & Wills, 1985). Apparently, the presence of social support helps reduce the outcomes of stress by serving as a buffer against stressful events that occur at work (Landsbergis et al., 1992). Why is this important? Because it is not possible to eliminate all potential sources of stress in the workplace; nor is it possible to arrange a perfect P-E fit for every worker. Thus, the availability of strong sources of social support may help reduce the consequences of unavoidable workplace stressors.

Third, companies can implement interventions to improve employees' ability to cope with workplace stress and to change unhealthy practices that can intensify the effects of stress (Maturi, 1992). A rapidly growing literature suggests that the most effective interventions are those that are (1) designed to meet the specific needs of individuals and (2) comprehensive and long-term in their focus.

For example, consider the results of one intriguing study conducted by Gregg and his colleagues (1990). These researchers began by interviewing more than 7,800 employees working in four manufacturing plants. Their survey revealed the presence of a substantial number of health risks among these workers: 19 percent had high blood pressure, 34 percent were overweight, and 44 percent were identified as smokers. Next, in two of the plants, wellness counselors contacted employees identified as having one or more health risks and designed individualized wellness programs specific to their needs. Then, over a three-year period, the counselors attempted to meet with each of the workers periodically to assess their progress, made changes to their programs if needed, and served as a support system to try to keep them motivated to stay with the program. At the end of the three-year study period, the researchers reassessed some of the at-risk workers identified at the beginning of the study to evaluate their progress in reducing their health risks.

Person-Environment (P-E) Fit: *The approach that suggests that a misfit between a person and his or her work environment may produce stress.*

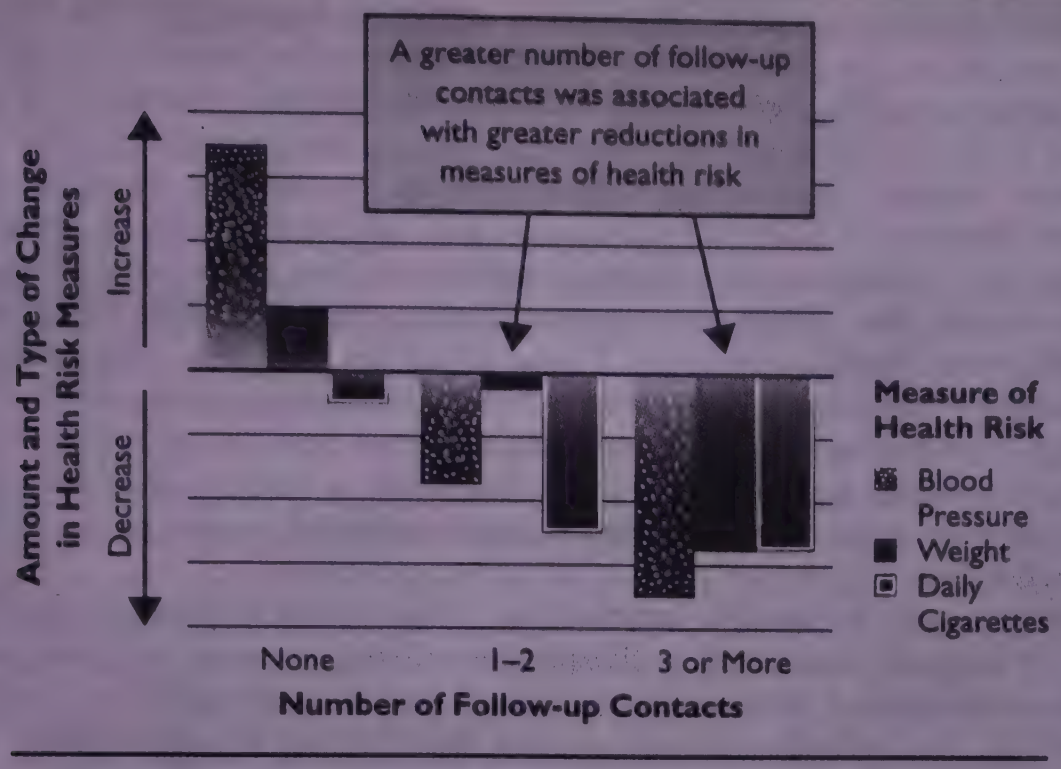


FIGURE 13.5

Reducing Workplace Health Risks: The Beneficial Effects of Wellness Programs

The greatest reductions in health risk measures were observed among participants having three or more follow-up contacts with their wellness counselors. In contrast, participants who had no contact with their counselors actually worsened on some measures of health risk.
(*Source:* Based on data from Gregg et al., 1990.)

As shown in Figure 13.5, results indicated that the program's effectiveness closely mirrored the amount of contact between the workers and the wellness counselors. Workers who had three or more follow-up contacts with a counselor showed the greatest reduction in their level of health risks. In contrast, workers who had no follow-up contacts actually increased their health risk on two of the measures, blood pressure and weight gain—reflecting the need for significant social support and follow-up in wellness programs.

The point of it all is that the results of systematic psychological research can have important applications, in this case to the reduction of the potentially devastating effects of stress in the workplace. As psychologists continue to refine their arsenal of techniques in this area, they will no doubt discover additional ways to help workers cope more effectively with the stressors they encounter at work.

STRESS: Some Major Effects

By now you may be convinced that stress stems from many different sources and exerts important effects on persons who experience it. What is sometimes difficult to grasp, though, is just how far-reaching these effects can be. Stress can influence our physical and psychological well-being, our performance on many tasks, and even the ultimate course of our careers.

STRESS AND HEALTH: THE SILENT KILLER The link between stress and personal health, according to medical experts, is very strong indeed (Kiecolt-Glaser & Glaser, 1992). In fact, some authorities estimate that stress plays some role in 50 to 70 percent of all physical illness (Frese, 1985). Moreover, included in these percentages are some of the most serious and life-threatening ailments known to medical science. To list just a few, stress has been implicated in the occurrence of heart disease, high blood pressure, hardening of the arteries, ulcers, and even diabetes.

How does stress produce such effects? The mechanisms involved remain to be determined precisely, but growing evidence suggests that the process goes something like this: By draining our resources and keeping us off balance physiologically, stress upsets our complex internal chemistry. In particular, it may interfere with efficient operation of our immune system—the elaborate internal mechanism through which our bodies recognize and destroy potentially harmful substances and intruders, such as bacteria, viruses, and cancerous cells. Foreign substances that enter our bodies are known as *antigens*. When they appear, certain types of white blood cells (lymphocytes) begin to multiply. These attack the antigens, often destroying them by engulfing them. Other white blood cells produce antibodies, chemical substances that combine with antigens and so neutralize them. When functioning normally, the immune system is nothing short of amazing: Each day it removes or destroys many potential threats to our health and well-being.

Unfortunately, prolonged exposure to stress seems to disrupt this system. For example, in studies with animals, subjects exposed to inescapable shocks demonstrated reduced production of lymphocytes relative to subjects exposed to shocks from which they could escape (Ader & Cohen, 1984). Studies of the effects of stress on animals and humans suggest that a variety of stressors, including disruptions in interpersonal relationships, loneliness, academic pressure, daily hassles, and the lack of social support, can interfere with our immune systems (Cohen et al., 1992; Jemmott & Magloire, 1988; Levy et al., 1989).

For example, in one study, Cohen and his colleagues (1992) explored the effects of social stability on the immune systems of monkeys. During the year preceding the study, all of the monkeys lived in stable (unchanging) social conditions. When the study began, however, the monkeys were randomly assigned to stable or unstable social conditions for a period of twenty-six months. Monkeys assigned to the stable condition remained with the same group for the entire study period. In the unstable condition, social groups were reorganized frequently. Further, the researchers observed and assessed the amount of time the monkeys spent in various forms of social interaction, including affiliative behaviors such as engaging in passive physical contact with other group members and grooming them. Why were the researchers interested in observing affiliative behaviors? They reasoned that if social support serves as a stress buffer, then the monkeys in the unstable group that engaged in the least amount of affiliative behaviors would experience the greatest negative impact on measures of immune functions. The results of the experiment confirmed these predictions.

In short, social support may be an important buffer against the adverse effects of chronic stress. These results are relevant to people, too. For example, persons who are divorced or separated from their spouses often experience reduced functioning in certain aspects of their immune system, compared to individuals who are happily married (Kiecolt-Glaser et al., 1987, 1988). Additionally, some recent evidence suggests that the effects of stress on our immune system may be less for people who have effective ways of dealing with their stressors than for those who do not. For example, some studies have shown that optimism, regular exercise, and feelings of control over stressful events are associated with reduced suppression of our immune system under stress (Taylor, 1991). Such findings are both unsettling and encouraging. On the one hand, they suggest that our complex, high-stress lifestyles may be undermining our ability to resist many serious forms of illness, at least to a degree. On the other hand, they indicate that reductions in such stress may be of major benefit to our overall health.

Stress and Task Performance Psychologists once believed that stress actually improves performance on a wide range of tasks. They held that the relationship between stress and task performance takes the form of an upside-down U: at first, performance improves as stress increases, presumably because the stress is arousing or energizing. Beyond some point, though, stress becomes distracting, and performance actually drops.

While this relationship may hold true under some conditions, growing evidence suggests that even low or moderate levels of stress can interfere with task performance (Motowidlo, Packard, & Manning, 1986; Steers, 1984). There are several reasons why this is so. First, even relatively mild stress can be distracting. People experiencing stress may focus on the unpleasant feelings and emotions it involves, rather than on the task at hand. Second, prolonged or repeated exposure to even mild levels of stress may exert harmful effects on health, and this may interfere with effective performance. Finally, a large body of research indicates that as arousal increases, task performance may rise at first, but at some point it falls (Berlyne, 1967). The precise location of this turning, or *inflection*, point seems to depend to an important extent on the complexity of the task performed. The greater the complexity, the lower the level of arousal at which the downturn in performance occurs. Are the tasks performed by today's working people more complex than those in the past? Many observers believe they are (Mitchell & Larson, 1987). For this reason, even relatively low levels of stress may interfere with performance in today's complex work world.

Together, these factors help explain why stress, even at fairly moderate levels, may interfere with many types of performance. However, stress does not always produce adverse effects. For example, people sometimes do seem to rise to the occasion and turn in sterling performances at times when stress is intense. Perhaps the most reasonable conclusion, then, is that while stress can indeed interfere with task performance in many situations, its precise effects depend on many different factors, such as the complexity of the task being performed and personal characteristics of the individuals involved. As a result, generalizations about the impact of stress on work effectiveness should be made with considerable caution.

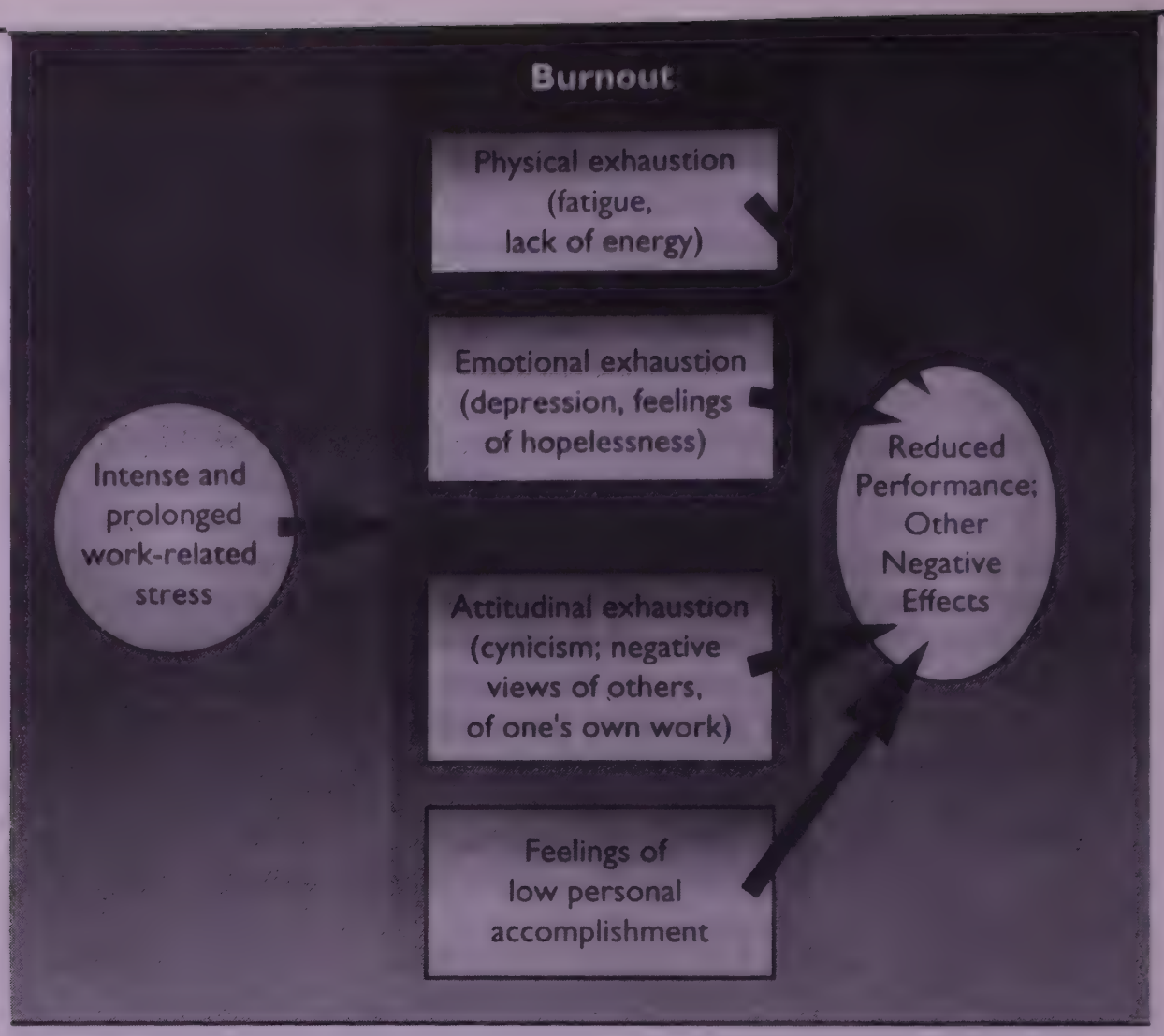
Burnout: When Stress Consumes Most jobs involve at least a degree of stress. Yet somehow the persons performing them manage to cope: They continue to function despite their daily encounters with various stressors. Some individuals, though, are not so lucky. Over time, they seem to be worn down (or out) by repeated encounters with stress. Such persons are said to be suffering from *burnout*, and they show several distinctive characteristics (Maslach, 1982; Pines & Aronson, 1988).

First, victims of burnout often suffer from *physical exhaustion.* They have low energy and always feel tired. In addition, they report many symptoms of physical strain, such as frequent headaches, nausea, poor sleep, and changes in eating habits. Burnout may also be associated with risk factors for cardiovascular disease (Melamed, Kushnir, & Shirom, 1992). Second, they experience *emotional exhaustion.* Depression, feelings of hopelessness, and feelings of being trapped in one's job are all part of the picture. Third, persons suffering from burnout often show *mental or attitudinal exhaustion,* often known as depersonalization. They become cynical, hold negative attitudes toward others, and tend to derogate themselves, their jobs, and life in general. To put it simply, they come to view the world around them through dark gray rather than rose-colored glasses. Finally, they often report feelings of *low personal accomplishment* (Maslach & Jackson, 1984)—feelings that they haven't been able to accomplish much in the past and probably won't be successful in the

FIGURE 13.6

Burnout: An Overview

Individuals exposed to high levels of work-related stress over long periods of time may suffer from *burnout*. This state involves *physical, emotional,* and *mental,* or *attitudinal,* exhaustion, as well as feelings of *low personal accomplishment.*



future, either. Studies conducted in work settings (Lee & Ashforth, 1990) seem to confirm that these factors actually provide an accurate description of burnout. (Please see Figure 13.6 for a summary.)

What are the causes of burnout? The primary factor, of course, is prolonged exposure to stress, but other factors, too, seem to play a role. Job conditions implying that one's efforts are useless, ineffective, or unappreciated seem to contribute to burnout (Jackson, Schwab, & Schuler, 1986). In particular, such conditions contribute to the feelings of low personal accomplishment that are an important part of burnout.

Similarly, poor opportunities for promotion and the presence of inflexible rules and procedures lead individuals to feel that they are trapped in an unfair system and to develop negative views of their jobs (Gaines & Jermier 1983). Personal factors also play a role. People with satisfying lives outside work settings, such as stable love relationships, are less likely to experience burnout than ones without these social buffers.

Whatever its precise causes, once burnout develops, its victims seem either to change jobs or to withdraw psychologically, marking time until retirement. Fortunately, however, growing evidence suggests that the effects of burnout can be overcome. With appropriate help, victims of burnout can recover from their physical and psychological exhaustion. If ongoing stress is reduced, if individuals gain added support from friends and coworkers, and if they cultivate hobbies and other outside interests, at least some persons can return to positive attitudes and high levels of productivity.

INDIVIDUAL DIFFERENCES IN RESISTANCE TO STRESS: OPTIMISM, PESSIMISM, AND HARDINESS It is clear that individuals differ in their resistance to stress. While some people suffer ill effects from even mild levels of stress,

Strategies Preferred by Optimists	Description
Problem-focused coping	Making specific plans for dealing with the source of stress; implementing such plans
Suppressing competing activities	Refraining from other activities until the problem is solved and stress is reduced
Seeking social support	Obtaining the advice of others; talking the problem over with others

Strategies Preferred by Pessimists	Description
Denial/distancing	Ignoring the problem or source of stress; refusing to believe that it exists or is important
Disengagement from the goal	Giving up on reaching the goal that is being blocked by stress
Focusing on the expression of feelings	Letting off steam instead of working on the problem directly

Table 13.2

Optimists and Pessimists: Contrasting Strategies for Coping with Stress

Optimists and pessimists employ different strategies in coping with stress. The strategies used by optimists seem to be more effective than those adopted by pessimists.

others are able to function effectively even in the face of intense, ongoing stress. How do such persons differ?

One answer involves the familiar dimension of *optimism–pessimism.* Optimists are people who see the glass as half full; pessimists are those who see it as half empty. Some evidence indicates that optimists—people who have general expectancies for good outcomes (Scheier & Carver, 1988)—seem to be much more stress-resistant than pessimists—people who have general expectancies for poor outcomes. For example, optimists are much less likely than pessimists to report physical illnesses and symptoms during highly stressful periods such as final exams. Additional evidence helps explain why this is the case. Briefly, optimists and pessimists seem to adopt different tactics for coping with stress (Scheier & Carver, 1992). Optimists focus on problem-focused coping: making and enacting specific plans for dealing with sources of stress. They also seek to obtain social support—the advice and help of others (Carver et al., 1993). In contrast, pessimists tend to adopt different strategies, such as giving up the goal with which stress is interfering or denying that the stress exists (Scheier, Weintraub, & Carver, 1986). Needless to say, the former strategies are often more effective than the latter. Table 13.2 presents a summary of the different strategies adopted by optimists and pessimists.

Interestingly, recent research indicates that males tend to use the strategies adopted by optimists to a greater extent than females do. When confronted with an upcoming, stressful event (for example, giving a lecture in front of a class), males engage in more problem-focusing coping; females tend to seek social support from friends or to engage in emotion-focused strategies such as wishful thinking (Ptacek, Smith, & Dodge, 1994). While these findings do *not* imply that men are necessarily more optimistic than women with respect to deal-

Key Points

- Stress may play a role in 50 to 70 percent of all physical illness, primarily through its effect on the immune system.
- Even relatively low levels of stress may interfere with task performance. Prolonged exposure to high levels of stress may cause burnout.
- Individual differences in optimism and hardiness help explain the ability of some people to cope with stress better than others.
- Hardy persons show high levels of commitment, regard change as an opportunity for growth, and have a sense of control over events in their lives.

ing with stressful situations, they do indicate that important gender differences seem to exist in terms of preferences for coping strategies.

Another characteristic that seems to distinguish stress-resistant people from those who are more susceptible to its harmful effects is **hardiness** (Kobasa, 1979). Actually, this term refers to a cluster of characteristics, rather than just one. Hardy persons, those who are relatively stress-resistant, seem to differ from others in three respects. First, they show higher levels of *commitment*—deeper involvement in whatever they do and stronger tendencies to perceive such activities as worth doing. Second, they tend to view change as a *challenge*—an opportunity for growth and development—rather than as a threat or a burden. Third, hardy persons have a stronger sense of *control* over events in their lives and over the outcomes they experience. Research findings indicate that persons high in hardiness report better health than those low in hardiness, even when they encounter major stressful life changes (Oulette-Kobasa & Puccetti, 1983).

These and other findings indicate that individuals differ greatly in terms of their ability to deal with stress. Understanding the reasons for such differences can be of considerable practical value. We'll return to various techniques for coping with stress in **Making Psychology Part of Your Life** at the end of this chapter.

Understanding and Communicating Our Health Needs

There is no doubt that modern medicine has provided us with the means to alleviate many types of disease and illness considered incurable until this century. Yet all the available medicine and technology still does not ensure that we will seek proper treatment when necessary, or that we possess the knowledge or skills necessary to realize when help is required. Moreover, because of the beliefs and attitudes we hold, it's often difficult for health professionals to get us to comply with good health-promoting advice.

Consider, for example, the results of an Australian study in which people were asked to identify the lifestyle or behavior patterns responsible for health problems in their country (Hetzel & McMichael, 1987). The most frequently cited examples were alcohol and drug abuse, poor diet, lack of exercise, and smoking—a clear indication that respondents were aware of the health risks associated with these behaviors. Similarly, when asked to name the changes that would most likely improve their own future health, the respondents cited better diet, more exercise, stopping or reducing smoking, reducing alcohol consumption, and coping better with their worries—again proof that they knew what they were supposed to do to improve their health. Yet when they were asked why they had not made changes in the behaviors they considered most essential to improving their own health, their answers—including "laziness," "lack of time," "not worthwhile," "too difficult or expensive," or "lack of social support"—suggested that sufficient motivation to change was simply not there. This suggests an important role for health psychologists: not only to help people achieve a better understanding of their health needs and inform them about the risks of specific unhealthy behaviors, but also to identify techniques to reduce or eliminate unhealthy behaviors and to promote the adoption of healthier lifestyles.

Hardiness: *A personality style characterized by high levels of commitment, a view of change as an opportunity for growth, and a strong sense of being in control.*

Symptom Perception: How Do We Know When We're Ill?

As we discovered in chapter 3, we all experience bodily sensations, such as the steady beating of our heart or the rush of air flowing in and out of our lungs as we breathe. But certain sensations—like irregularities in heartbeat, tiny aches and pains, a slight queasiness, or a backache—are often termed *symptoms*, because they may reflect an underlying medical problem. But what factors determine how people experience symptoms?

Important factors, research seems to indicate, are individual differences in attention to our bodies and certain situational factors that influence our attention (Taylor, 1991). Those who focus their attention on themselves tend to notice symptoms more quickly than those who focus on the external environment. People who live with others, have interesting jobs, and lead exciting lives may be less likely to notice symptoms than are less active people who have boring jobs and/or who live alone (Pennebaker, 1983). In other words, we are most likely to notice symptoms when there are few distractions. Situational factors, such as our moods, can also determine the direction of our attention and thus affect whether we notice symptoms. People who are in a good mood report fewer symptoms and rate themselves as more healthy than people who are in a bad mood (Salovey & Birnbaum, 1989). Some symptoms, however, are difficult or almost impossible to notice on one's own. For example, the early detection of my grandfather's cancer led to successful treatment and a full recovery. The early diagnosis was possible not because my grandfather experienced any obvious symptoms, but rather because of his insistence on regular annual medical examinations.

Psychological factors also determine how we interpret symptoms. We often interpret the meaning of our current symptoms by comparing them with those we have experienced in the past. We recognize a runny nose, watery eyes, and tiredness as symptoms of the onset of a cold. In these instances our experience, or the experience of others, tells us that the underlying illness is probably not fatal and that the treatment of choice may include lots of rest, plenty of water, and staying dry and warm. Finally, our expectations can influence our interpretation of symptoms by causing us to focus on symptoms we are expecting and ignore those we are not expecting. After you visit a sick friend, a barely noticeable tickle in your throat may lead you to believe you are catching her cold. Because you expect to get sick, you interpret the tickle as a sign of illness.

Health Beliefs: When Do We Seek Medical Advice?

How do we decide that a symptom is severe enough to require medical attention? A number of factors may help determine the conditions under which we actually go to a doctor, clinic, or emergency room. Surprisingly, some evidence suggests that people may not seek help even when they know that something is seriously wrong (Locke & Slaby, 1982). Why is this so?

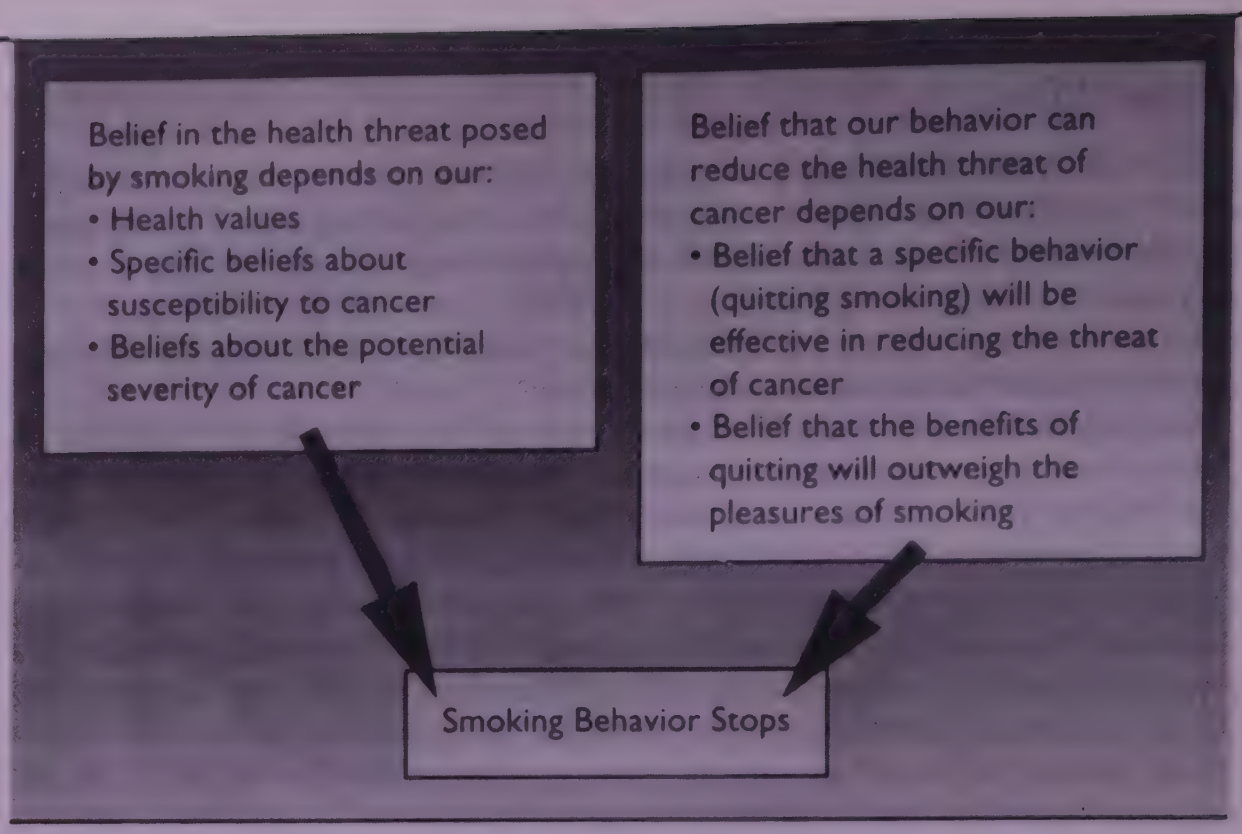
The **health belief model,** initially developed to help explain why people don't use medical screening services, may help us to understand the reasons. As shown in Figure 13.7 (on page 520), this model suggests that our willingness to seek medical help depends on: (1) the extent to which we perceive a threat to our health; and (2) the extent to which we believe that a particular behavior will effectively reduce that threat (Rosenstock, 1974). The perception of a personal threat is influenced by our health values, our specific beliefs about our susceptibility to a health problem, and our beliefs concerning the

Health Belief Model: *A model predicting that whether a person practices a particular health behavior depends on the degree to which the person believes in a personal health threat and believes that practicing the behavior will reduce that threat.*

FIGURE 13.7

The Health Belief Model

The health belief model suggests that whether a person practices a particular health behavior depends on the degree to which she or he believes in a personal health threat—and believes that practicing the behavior will reduce that threat. Each of these beliefs is influenced by additional variables. Here, the health belief model is applied to smoking.



seriousness of the problem. For example, we may decide to stop smoking if we value our health, if we feel that our smoking might lead to fatal lung cancer, and if we don't like what we hear about death from lung cancer (refer again to Figure 13.7).

Our perceptions that our behavior will be effective in reducing a health threat—in this case the risk of lung cancer—depend on whether we believe that a particular practice will reduce the chances we will contract a particular illness and whether the perceived benefits of the practice are worth the effort. For example, whether a smoker concerned about developing cancer will actually quit depends on two beliefs: that giving up smoking will reduce the risk of cancer and that the benefits of doing so will outweigh the immediate pleasures of smoking.

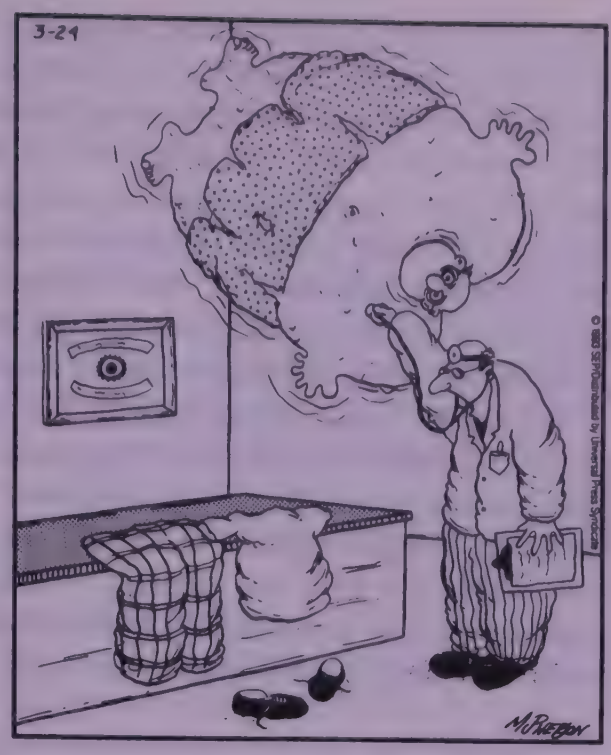
The health belief model helps explain why certain people, especially young persons and adults who have never experienced a serious illness or injury, often fail to engage in actions that would be effective in preventing illness or injury—such as using a safety belt when driving a car or wearing a condom during sexual intercourse (Taylor & Brown, 1988). They don't engage in such preventive, health-protecting actions because, in their minds, the likelihood of experiencing illness or injury is very low—so why bother? (See the discussion of adolescent invulnerability in chapter 9 for more information on this topic.)

The health belief model also suggests that if people believe that their actions will be ineffective in changing their health status, they will be less likely to seek help or engage in healthy behaviors. For example, suppose you are overweight and have a family history of high blood pressure. Because you do not believe that anything can be done to lessen your genetic predisposition for heart attacks, you may refuse to adhere to a recommended diet and exercise program, even when you begin to experience symptoms.

Doctor-Patient Interactions: Why Can't We Talk to Our Doctors?

Imagine the following situation: You are waiting in a crowded doctor's office. It's already forty-five minutes beyond your scheduled appointment time, and you are growing more impatient by the minute. Then, just before

you reach the end of your rope, the nurse finally calls your name. Relieved finally to get away from the congestion of the waiting room, you swallow the choice words you've been saving for the doctor. But then, adding insult to injury, she sticks her head in the door of the examining room, says, "Please be seated, I'll be right back," and leaves! Fully twenty minutes pass before she returns. She offers no apology for the delay. After a rapid succession of questions, pokes, and prods, the doctor scribbles a prescription onto a piece of paper and says, "Take two of these four times a day, and call my office in a week if you have further problems." Then she promptly leaves once more.



"Exhale."

If aspects of the preceding scene sound familiar, then you may recognize the frustration that stems from ineffective doctor-patient interactions. Indeed, research has repeatedly documented the existence of communication problems between physicians and their patients (Roter & Ewart, 1992; Waitzkin, 1984). Although health care experts have long recognized the need for improving this process, it is only since the 1970s that researchers have systematically examined the doctor-patient communication process (Roter & Hall, 1989).

Duffy, Hamerman, and Cohen (1980) attempted to quantify aspects of the communication that takes place between patients and their doctor. These researchers selected ten communication skills they considered crucial to the communication process and then observed how often doctors exhibited these skills during actual medical examinations. The most frequently observed communication skills were those dealing with the mechanics of patients' illnesses, such as direct physical examination of illness-relevant areas and explanation of the nature of prescribed medication and therapy. In contrast, the skills observed least frequently were those related to the psychosocial aspects of patients' problems, such as asking patients what they knew or how they felt about their illnesses.

Although not conclusive, results like these have suggested that it may be important for physicians to receive as part of their medical education communication skills training—training in both people skills and technical skills. Indeed, growing evidence suggests that rapport and the quality of information communicated are critical factors in successful treatment of the disease and the person (Roter & Ewart, 1992).

Also, because communication is a two-way process, researchers now believe that both patients and doctors have important responsibilities during medical examinations. In one study, Hall, Roter, and Katz (1987) examined the relation of communication to patient outcomes such as satisfaction, recall of important medical information, and compliance. They quantified the communication process by categorizing behaviors observed during doctor-patient interactions into six categories: information giving, question ask-

Doctor-Patient Interactions: Communication Is the Key

Both physicians and their patients play an important role in the communication process.

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Key Points

- Symptoms, or sensations such as irregularities in heartbeat, are useful because they may reflect an underlying medical problem.
- According to the health belief model, willingness to make lifestyle changes or to seek medical help depends on one's beliefs concerning susceptibility to an illness, the severity of the illness, and the effectiveness of taking steps to deal with it.
- Doctors are often more effective in handling technical information than psychosocial concerns. Interventions designed to improve doctor-patient communication have a beneficial impact on important medical outcomes.

ing, social talk, positive talk, negative talk, and partnership building. They subdivided these categories, for both physician and patient, into either task-focused or socioemotional dimensions of behavior (Roter, Hall, & Katz, 1988). The results of their investigation showed that both physicians and their patients have important roles in task-focused *and* socioemotional communication. All of the patient outcomes considered—satisfaction, recall of important medical information, and compliance—were strongly related to the amount of information given by the doctor during the medical encounter, particularly when the interaction included positive social conversation.

Together, these studies underscore the importance of training in communication skills for health care professionals. In order to be effective in treating patients and promoting their wellness, doctors, nurses, and other health professionals need to know how to get their message across—how to communicate effectively with the persons who come to them for help. The important benefits include increased patient satisfaction and improved quality of diagnostic information (Macguire, Fairburn, & Fletcher, 1986).

BEHAVIORAL AND PSYCHOLOGICAL CORRELATES OF ILLNESS: *The Effects of Thoughts and Actions on Health*

Consider this surprising chain of events. During the 1950s a terminally ill cancer patient learned of an experimental anticancer drug. Though the odds were slim, this patient requested treatment with the drug, hoping it would result in a cure. Amazingly, following treatment with the drug, the patient's cancer went into remission and he was able to leave the hospital, even returning to work. Then a curious and unfortunate thing happened: Evidence appeared indicating the anticancer drug he had taken was ineffective as a cancer treatment. When the patient learned about the ineffectiveness of his "wonder drug," his cancer returned. Understandably concerned, his doctor deceived him with the promise of an effective treatment—an improved and purer drug. Actually, the new drug was a placebo; the doctor reasoned that if it was the patient's will and not the drug that had produced the first remission, then there was every reason to believe that this strategy would succeed again. As predicted, the patient made a second recovery, and the cancer was again in remission. Unfortunately, a few months later another government report stated that the new anticancer drug he had supposedly taken was of no value for the treatment of cancer. Within a few days, the man died (Levy, 1990).

Although one should be skeptical about reports of miraculous remissions or even cures of cancer or other serious illness like the one I've just described, a possible basis for such events is becoming clear. **Cancer**, an illness in which proliferating abnormal cells overwhelm normal tissue, is often viewed as a physical illness with a definite genetic component; but mounting evidence suggests that psychological variables interact in important ways with physical conditions to determine cancer's progression. In other words, aspects of our behavior, perceptions, and personality contribute to this disease process.

Cancer: A group of illnesses in which abnormal cells are formed that are able to proliferate, invade, and overwhelm normal tissues and to spread to distant sites in the body.

One common characteristic among individuals from families with high cancer rates is a diminished efficiency of their natural killer cells—those designed specifically for the surveillance and destruction of cancerous tumor

cells (Kiecolt-Glaser & Glaser, 1992). In most cases, however, whether we actually develop a cancer or other illness is moderated by **risk factors**—aspects of our lifestyle that affect our chances of developing or contracting a particular disease, within the limits established by our genes (American Cancer Society, 1989).

A deadly class of risk factors are the behaviors within our lifestyle that increase our exposure to **carcinogens**—cancer-producing agents in our environment. Tobacco and the smoke it produces, chemicals in the food that we eat, air that we breathe, alcohol in the beverages we drink, and the radiation we receive from overexposure to the sun have all been implicated to some extent as carcinogens. It was because of concerns about exposure to such substances that in 1994, many people in the United States protested about plans to sell milk from cows fed large amounts of growth hormones: The protesters didn't want such substances in their milk.

Because many risk factors involve people's behaviors, psychologists can play a crucial role in cancer prevention by developing techniques to reduce unsafe behaviors like smoking and to promote healthy behaviors like exercise and a proper diet. We'll now consider several behavioral risk factors that may contribute to the development of certain illnesses.

Smoking: Risky for You and Everyone around You

Smoking is the largest preventable cause of illness and premature death (before age sixty-five) in the United States, accounting for about 125,000 deaths annually (American Cancer Society, 1989). It is the leading cause of several types of cancer, including cancers of the larynx, bladder, cervix and lung; indeed, a large body of evidence suggests that cigarette smoking is the principal cause of lung cancer (Lubin & Blot, 1993). Smoking also causes **cardiovascular disease** (disease of the heart and blood vessels).

Despite the risks associated with smoking, 25 percent of adults in the United States continue to smoke (Blume, 1993). Fortunately, recent evidence from the 1992 U.S. Census Bureau's Current Population Survey suggests that, in general, increasing numbers of people in the United States are learning to "break" their smoking habit. For example, the percentage of people who smoke decreased, especially among men, from about 50 percent in 1965 to about 30 percent in 1989. Similarly, cigarette smoking among high school students dropped from 71 percent in 1980 to 61.8 percent in 1992. Yet the overall number of smokers has remained constant, largely because of increases in the U.S. population over this period. One cause for alarm is the observed increase in smoking among some subgroups—especially young women in the United States and people in developing nations (Rothenberg & Koplan, 1990). The increased incidence of smoking has been accompanied by a parallel increase in the incidence of lung and other types of cancer among persons in these groups (Giovannucci et al., 1994). We'll explore this intriguing trend further in the **Perspectives on Diversity** section on page 525.

Why do people smoke? Genetic, psychosocial, and cognitive factors seem to play a role. Individual differences in our reaction to **nicotine**, the addictive substance in tobacco, suggest that some people are biologically predisposed to become addicted to nicotine, whereas others remain unaffected—evidence that our genes play a role in determining who will become a smoker (Pomerleau & Pomerleau, 1984). Nicotine enhances the availability of certain neurotransmitter substances, such as acetylcholine, norepinephrine, dopamine, and endogenous opioids. As you may recall from chapter 2, these substances produce temporary improvements in concentration, recall, alertness, arousal,

Risk Factors: *Aspects of our environment or behavior that influence our chances of developing or contracting a disease, within the limits set by our genetic structure.*

Carcinogens: *Cancer-producing agents.*

Cardiovascular Disease: *All diseases of the heart and blood vessels.*

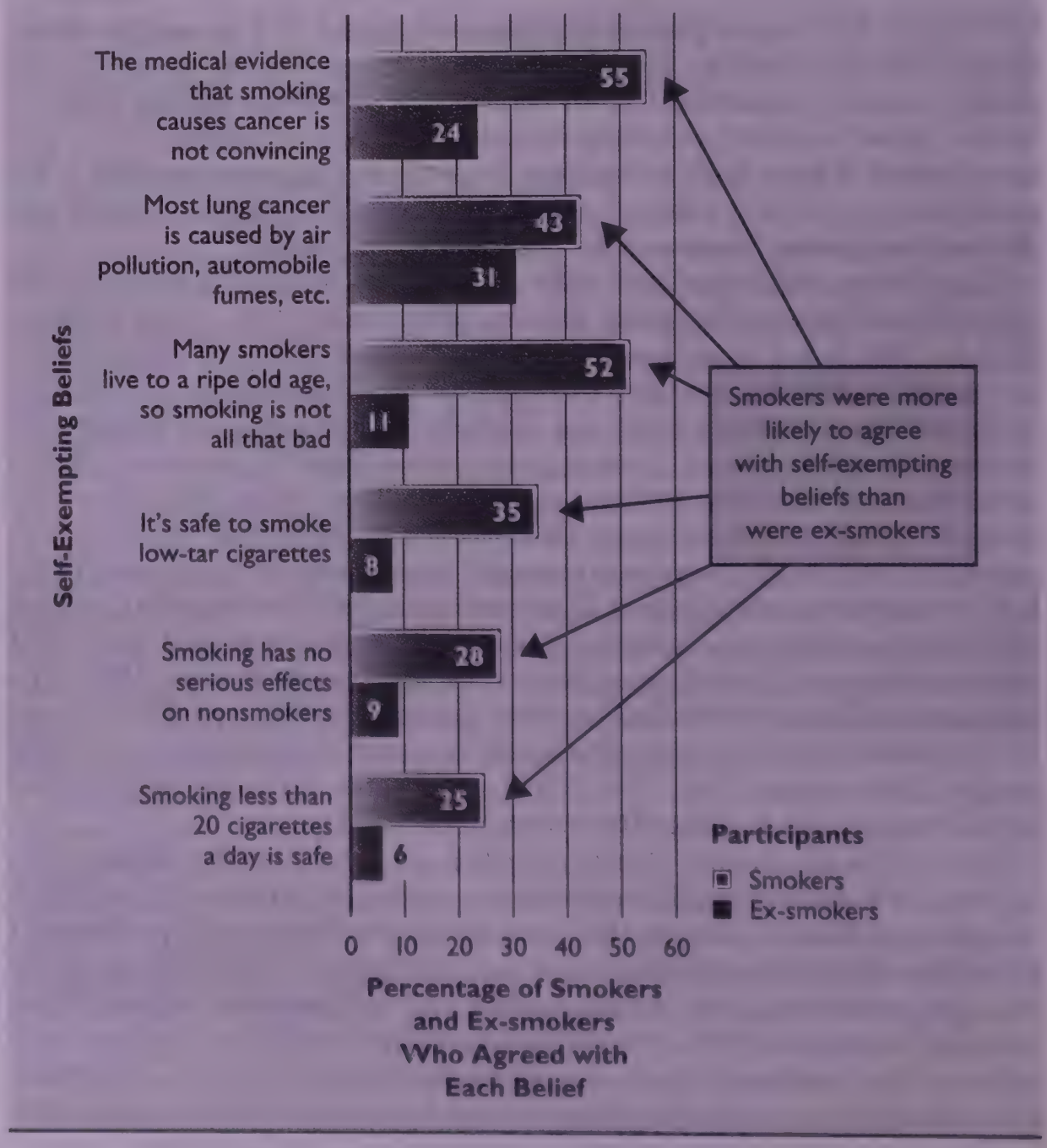
Nicotine: *The addictive substance in tobacco.*

and psychomotor performance that can be extremely pleasurable for some people. Other evidence suggests that psychosocial factors play a role in establishing smoking behavior, especially among young persons. Adolescents may be more likely to smoke if their parents or other role models smoke, or if they experience peer pressure to do so. Some researchers suggest, however, that smoking among adolescents is only part of a larger problem-behavior syndrome that may include problem drinking, drug use, and other delinquent behaviors (Donovan & Jessor, 1985). Finally, cognitive factors also appear to influence people's tendency to continue smoking. Most smokers recognize that smoking is harmful to their health, yet many continue to smoke. One possible explanation for this gap between their beliefs and their actions is that smokers may hold a set of false beliefs that serve to exempt them from personalizing their knowledge regarding the harmful consequences of smoking. To test this possibility Chapman and his colleagues (1993) asked two groups of people—smokers and ex-smokers—to indicate their agreement or disagreement with a series of self-exempting beliefs. As shown in Figure 13.8, smokers were more likely to agree with these beliefs than ex-smokers. While these results are preliminary, they do seem to suggest that developing ways to change the erroneous beliefs of smokers may be one important tool to help these persons kick the habit.

FIGURE 13.8

The Role of Self-Exempting Beliefs in Smoking

As predicted, smokers were more likely to agree with *self-exempting beliefs* than ex-smokers. These data help explain why smokers continue to smoke—even when they are aware of the danger of doing so. These results also illustrate the important role of cognitive processes in determining health-related behaviors, including smoking. (*Source:* Based on data from Chapman et al., 1993.)



Global Equality: Susceptibility to the Adverse Effects of Smoking

There are many ways in which people from around the globe differ, but one way in which they appear to be the same is in their susceptibility to the adverse health effects of smoking. This is an important point, since recent assessments of the prevalence of smoking show that the number of smokers worldwide—and hence the incidence of lung and other forms of cancer—continues to climb (LaVecchia et al., 1992, 1993). For example, since 1950 deaths from lung cancer in Japan have increased tenfold among men and eightfold among women. Even more disturbing is the prediction that rates of smoking-related deaths among men in Central and Eastern Europe will soon exceed the highest rates ever recorded (Boyle, 1993).

The percentage of deaths attributable to smoking has traditionally been higher for males than for females in many parts of the world (Peto et al., 1992); see Figure 13.9. However, growing evidence suggests that this difference is disappearing—especially for female smokers in the United States. As shown in Figure 13.9, the percentage of deaths attributed to smoking in 1985 was higher

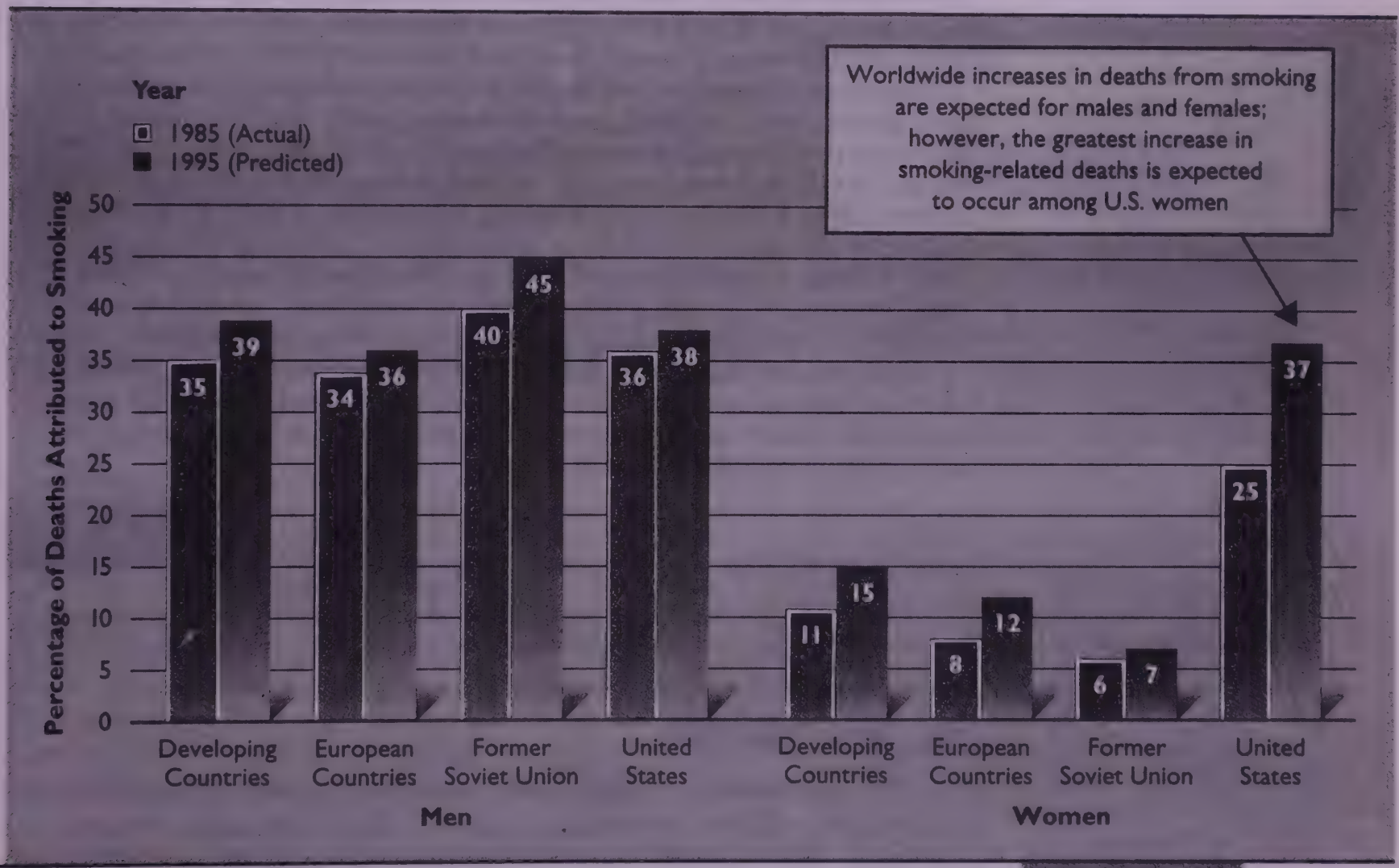


FIGURE 13.9

Percentage of Deaths Attributed to Smoking for Men and Women around the World

The percentage of deaths attributed to smoking is increasing in many parts of the world for men and women. The increase in the percentage of deaths due to smoking is increasing at an alarming rate for U.S. women, however.
(*Source:* Based on data from Peto et al., 1992.)

SMOKING: NO CULTURAL BOUNDARIES

The adverse effects of smoking are seen worldwide. In Japan, deaths from lung cancer have increased tenfold since 1950.

for women in the United States than for women in other parts of the world—though still less than for their male counterparts. Scientists anticipate that over the next few years the percentage of deaths due to smoking among U.S. men and women will become increasingly similar. What is the reason for this swift rise in smoking-related deaths among women? Although scientists are not certain, part of the reason may be the large increase in the number of women who smoke in the United States and throughout the world (Boyle, 1993). And as women in the United States continue to move into high-pressure occupations that encourage some people to smoke, this trend is expected to continue.

The dangers of smoking are not limited to the smoker, however. Inhaling second-hand smoke, referred to as **passive smoking,** can also increase the incidence of respiratory disease and cardiovascular disease for smokers' family members and coworkers (Environmental Protection Agency, 1992). The effects of passive smoking can be particularly devastating for certain groups, including women and children. For example, nonsmoking women who live or work in an environment with a spouse or coworkers who smoke are at significantly greater risk of developing lung cancer than women who are not exposed to these conditions (Stockwell et al., 1992). In fact, the results of one study showed that nonsmoking women living with a smoking spouse experienced a 50 percent increase in their risk of developing lung cancer (Fontham, Correa, & Wu-Williams, 1991).

Passive smoking also adversely affects children: It causes more frequent and more severe attacks of asthma in children who already have the disease, and it may even produce brain tumors (Chilmonczyk et al., 1993; Gold et al., 1993). Further evidence shows decreased test performance among adolescents regularly exposed to their parent's smoking. Apparently, mental performance is affected by the carbon monoxide in tobacco smoke. Increasing concern over the many possible effects of passive smoking has prompted many companies to institute restrictive smoking policies and, in some cases, workplace smoking bans to reduce the health risks to nonsmoking coworkers (Borland et al., 1990).

These findings, and others, suggest that smoking is indeed the great equalizer. As smoking rates continue to soar worldwide, increases in the rates of cancer and cardiovascular diseases can be expected to follow among smokers and, unfortunately, those around them.

DIET AND NUTRITION: What You Eat May Save Your Life

Poor diet has been most closely linked with cancer of the colon and rectum. Fortunately, regular consumption of certain foods may *reduce* your risk of developing these cancers. Eating vegetables like broccoli and cauliflower may reduce the risk of cancer by inhibiting tumor formation and growth. Similarly, vitamin A—found in carrots, spinach, and cantaloupe—facilitates proper cell division and inhibits the destruction of healthy cells by carcinogens (Willet & MacMahon, 1984). Dietary fiber has also been proposed as a possible inhibitor of colorectal cancer (Graham, 1983).

Passive Smoking: *Inhaling other people's cigarette smoke.*

Disturbing increases in the rates of breast cancer among women in the United States and other countries has led to large-scale multicultural studies

to determine the cause. Growing evidence suggests that lifestyle factors, including the amount of fat consumed, may be among the culprits (Freedman et al., 1993; Makita & Sakamoto, 1990). For example, Howe and his colleagues (1990) examined the combined results of twelve previously conducted studies of diet and breast cancer including data from Australia, Canada, China, Greece, Hawaii, Israel, and Italy. Their analysis showed a consistent positive association between breast cancer risk and saturated fat intake for postmenopausal women, though not for premenopausal women. Additionally, as expected, these studies showed an inverse association between fruit and vegetable intake and risk for breast cancer.

Diet is also a significant risk factor in the development of *cardiovascular disease*, a term used to describe all diseases of the heart and blood vessels, including arteriosclerosis (hardening of the arteries), coronary heart disease (reduced blood flow to the heart), and stroke (bursting of a blood vessel in the brain). Most cardiovascular diseases affect the amount of oxygen and nutrients that reach organs and other tissues; prolonged oxygen and nutrition deficiency can result in permanent damage to the organs or tissues and even death. Arteriosclerosis, the major cause of heart disease in the United States, is caused by the buildup of cholesterol and other substances on arterial walls, which leads to a narrowing of those blood vessels. A large body of evidence shows that high levels of **serum cholesterol**, or blood cholesterol, are strongly associated with increased risk of cardiovascular diseases (Allred, 1993; Klag et al., 1993).

Interestingly, the level of cholesterol in our blood is greatly affected by the amount of fat, especially saturated fat, and cholesterol in our diets. Serum cholesterol can be greatly reduced through a diet that is low in fats, cholesterol, and calories, and high in fiber, fruits, and vegetables (Carmody, Matarazzo, & Istvan, 1987). Unfortunately, it is difficult to get people to adhere to proper diets. Interventions designed to change people's eating habits, such as mass media campaigns, are often effective initially, but do not maintain the change over time. One approach that shows substantial promise for helping high-risk individuals to make long-term changes in their eating habits calls for the active involvement of the person's family in designing and implementing behavior change programs.

Alcohol Consumption: *Here's to Your Health?*

Although strong evidence suggests that biological and genetic factors contribute to alcoholism and problem drinking (Reid & Carpenter, 1990), psychosocial factors, including stress, environmental cues, and social pressure from peers, also play a significant role in determining drinking behavior. And even though evidence suggests that a daily glass of red wine may be associated with health benefits, too much alcohol can be harmful and can lead to a variety of social and physical disorders. The consequences of drinking can include stomach disease; cirrhosis of the liver; cancer; impaired sexual functioning; cognitive impairment; and, as we saw in chapter 8, *fetal alcohol syndrome*, a condition of retardation and physical abnormalities that occurs in children of mothers who are heavy drinkers. The amount of alcohol we drink is directly related to our risk for developing certain disorders. For example, drinking an average of 1.5 or more beers per day has been linked to subsequent development of

Key Points

- Cancer is a group of diseases characterized by a loss of some cells' ability to function normally. Cancerous cells multiply rapidly, generating tumors.
- Individual differences in people's reaction to nicotine, the addictive substance in tobacco, help determine who will become a smoker.
- Both smoking and passive smoking are implicated in many cancers, in cardiovascular disease, and in sickness among children.
- Poor diet can raise our risks of cancer of the colon and rectum, breast cancer, and cardiovascular disease.
- Heavy drinking can cause diseases of the stomach, liver, and intestines. It can also impair mental and sexual functioning, and it can result in fetal alcohol syndrome.

Serum Cholesterol: *The amount of cholesterol in one's blood.*

colon and rectum cancer (Pollack et al., 1984). Drinking alcohol may also interact with smoking to increase cancer risk. Drinkers of alcohol who are also heavy smokers have twenty-two times greater risk of developing cancer than individuals who neither smoke nor drink (Rothman et al., 1980).

Emotions: Mood and Health

Inadequate emotional expression—especially of negative feelings—can have an adverse effect on the progression of certain types of illness, such as cancer. Individuals who cope with stress by keeping their negative emotions to themselves are likely to experience suppressed immune systems, greater recurrence of cancer, and higher mortality rates (Levy et al., 1985). In contrast, patients who demonstrate positive affect—especially joy, well-being, and happiness—increase the likelihood of recovery (Levy et al., 1988).

A curious point is the relation between expression of distress and treatment outcome. Open expression of negative affect and a willingness to fight illness are sometimes associated with greater immune function, decreased recurrence rates, and increased survival time, even among patients at advanced stages of cancer. For example, combative individuals—those who express anger about getting cancer and hostility toward their doctors and family members—often live longer than patients who passively accept their fate and quietly undergo treatment (Levy, 1990).

Emotion can also play a role in the progression of **hypertension,** or high blood pressure, a condition in which the pressure within the blood vessels is abnormally high. Prolonged hypertension, when untreated, can result in extensive damage to the entire circulatory system. Indeed, about 30 percent of cardiovascular disease deaths each year are attributable to hypertension. Some evidence suggests that emotional stressors can affect the regulation of blood pressure through neurohormonal mechanisms (Krakoff et al., 1985). For example, anxiety and hostility can increase general arousal and facilitate the release of *catecholamines*—a class of neurotransmitters that play an important role in the sympathetic nervous system. The release of the catecholamine epinephrine has the effect of boosting our overall readiness to act, including our blood pressure. Although the effects of emotional stressors are usually brief, extreme reactivity to anxiety, hostility, and anger may indicate a predisposition to develop hypertension (Rosenman, 1988). Not surprisingly, the strongest relations between emotions and blood pressure have been found for unexpressed anger and hostility.

Personality and Health: Type A Behavior Pattern Think about the people you know. Can you name one person who always seems to be in a hurry, is extremely competitive, and is often hostile and irritable? Now, in contrast, can you name one who shows the opposite pattern—someone who is relaxed, relatively uncompetitive, and easygoing in relations with others? If you succeeded, you now have in mind two people who could be described as showing Type A and Type B behavior patterns, respectively.

Interest in the **Type A behavior pattern** was first stimulated by medical research. Several physicians (Jenkins, Zyzanski, & Rosenman, 1979, and their colleagues) noticed that many patients who had suffered heart attacks seemed to share certain personality traits (please refer to chapter 12). Individuals who tend to be competitive, aggressive, hostile, and impatient are displaying a pattern of behaviors termed Type A. They are likely to be hard workers and tend to seek out the most challenging and stressful work conditions. Often, their efforts are rewarded with additional work from their superiors and coworkers (Feather & Volkmer, 1988). But some researchers now

Hypertension: *High blood pressure, a condition in which the pressure within the blood vessels is abnormally high.*

Type A Behavior Pattern: *A cluster of traits such as competitiveness, aggressiveness, urgency, and hostility; related to important aspects of health, social behavior, and task performance.*

believe that only certain aspects of the Type A pattern may be related to increased risk of heart disease. Recent findings suggest it may be only those Type A individuals who fail to express their emotions—especially anger, cynicism, and hostility—and fail to ignore early symptoms of cardiovascular disease who are at risk (Matthews, 1988). A particular type of hostility—*cynical hostility*, characterized by suspiciousness, resentment, anger, antagonism, and distrust of others—may be especially detrimental.

TYPE A BEHAVIOR PATTERNS AND HEALTH PROBLEMS

Type A persons tend to be always in a hurry, competitive, aggressive, hostile, and impatient. They are more than twice as likely as Type B persons to have coronary problems. Research shows that one aspect of Type A behavior—*cynical hostility*—may be particularly detrimental.

How can a Type A profile promote heart disease? The emotional reactions among Type A individuals may result in constriction of peripheral blood flow, higher blood pressure, and increased pulse rate (Lyness, 1993). Such changes in the cardiovascular system may produce excessive wear on the arteries of the heart, leading to the development of cardiovascular disease (Contrada, 1989). Additional evidence suggests that the emotional responses of Type A individuals are accompanied by increased hormone levels in the bloodstream, such as the catecholamines adrenaline and noradrenaline. These increased hormonal levels may lead to greater fatty deposits on the walls of blood vessels and ultimately to heart disease (Dembrowski & Williams, 1989).

Yet there may also be some health benefits to being Type A. In a thirteen-year longitudinal study of Type A and Type B men, researchers found that although the Type As had significantly more heart attacks than Type Bs, they were more likely to survive those heart attacks (Ragland & Brand, 1988). It appears that the personality style that drove them to heart attacks may also include behaviors that increase adherence to post–heart attack treatment. In short, the very characteristics that threaten to kill Type As may, under certain circumstances, be the same ones that save their lives.

AIDS: The New Assault on Public Health

Acquired immune deficiency syndrome (AIDS) is a viral disease that reduces the immune system's ability to defend itself against the introduction of foreign matter. The first cases of AIDS in the United States were reported in 1981, although we now know there were cases that occurred before that date. It was not until 1984 that the cause of AIDS was isolated—a virus labeled *human immunodeficiency virus*, or *HIV*—and an antibody test was developed to detect infection.

ACQUIRED IMMUNE DEFICIENCY SYNDROME: THE FACTS ABOUT AIDS Since 1981 researchers have discovered a number of frightening facts about AIDS. First, the estimated incubation period—the time it takes for the disease to develop—can be as long as ten years (Bachetti, 1990). This means that infected individuals can spread the disease to others without even realizing that they are infected. Thus, it is not surprising that the incidence of AIDS increased rapidly in the United States—from 250 cases documented in the early 1980s to an estimated 300,000 new cases occurring in 1993 alone (Centers for Disease Control, 1993). In fact, AIDS is now the second leading cause of death among American men between the ages of 18 and 44 and the sixth leading cause of death for American women in this age group (Kelly et al., 1993). Second, AIDS

Acquired Immune Deficiency Syndrome (AIDS): *A fatal viral infection that reduces the immune system's ability to defend itself against the introduction of foreign matter.*

FIGURE 13.10

Estimated Distributions of HIV Infections Worldwide

The World Health Organization estimates that as of mid-1993, more than 13 million persons have become infected with HIV. (*Source:* Based on suggestions by Merson, 1993.)

is fatal, and growing evidence suggests that most—although not all—individuals infected with HIV will eventually develop AIDS. Since there are currently no effective vaccines or treatments for HIV, it is estimated that tens of millions of people will die from AIDS-related illnesses (Cohen, 1993). The World Health Organization estimates that over 13 million people worldwide are already infected with HIV. As shown in Figure 13.10, most of these persons are located in parts of Africa and other developing nations. Third, an individual can be infected only if the virus is introduced directly into the bloodstream. This means that the disease cannot be contracted through such actions as shaking hands with or hugging an infected person; it can be spread only if the blood or semen of an infected person directly contacts the blood system of the potential recipient.

There are two primary ways in which HIV is spread: through unprotected sexual intercourse and infected blood or blood products. The process by which HIV produces AIDS symptoms is complex, but essentially involves the devastation of aspects of the infected person's immune system, making the person extremely vulnerable to a host of infections that ultimately result in death (Weiss, 1993). Interestingly, scientists have identified persons who appear to be resistant to HIV, including a group of female prostitutes in Nairobi, Kenya. These women have had unprotected sex with hundreds or even thousands of HIV-positive men. They have contracted other sexually transmitted diseases, such as syphilis and gonorrhea. Yet, amazingly, scientists can find no trace of HIV in their bodies (Purvis, 1993). We'll consider additional facts regarding this devastating disease—including strategies to prevent the spread of HIV—in more detail in the **Research Process** section.

KEY POINTS

- Inadequate emotional expression can adversely affect the progression of cancer. Emotions also affect high blood pressure.
- Type A persons tend to be competitive, aggressive, hostile, and impatient. Those who fail to express their emotions and ignore early symptoms of cardiovascular disease are most at risk for having heart attacks.
- Acquired immune deficiency syndrome (AIDS) is a reduction in the immune system's ability to defend the body against invaders. AIDS is transmitted primarily through unprotected sex and infected blood.

Changing Risky Behaviors: An Ounce of Prevention Is the Only Known Cure

Why are, psychologists so interested in AIDS? One reason, aside from the tragic consequences of this disease, is that people contract HIV as a result of certain behaviors. Although initially researchers thought AIDS was a disease of homosexuals and intravenous drug users, we now know that any person engaging in certain types of behavior is at risk for contracting HIV. In fact, AIDS is currently being spread mainly through unprotected heterosexual rather than homosexual intercourse. HIV transmission through sex among heterosexual populations in Africa, India, and Asia has risen sharply over the past several years and is expected to reach many tens of millions by the year 2000 (Mann, 1992). Efforts to develop effective medical preventive or therapeutic treatments for HIV have not yet been successful. Recent evaluations of AZT—the main drug currently used to treat persons infected with HIV—suggest that its beneficial effects are limited and short-lived, possibly because the HIV quickly mutates into new forms that are resistant to the drug (Cohen, 1993). Some evidence suggests that HIV-infected persons receiving AZT may not live any longer than persons receiving a placebo drug. Scientists are now uncertain when, or even if, an effective drug treatment for the HIV will be discovered (Haynes, 1993).

Therefore, at present, the only effective means of combating AIDS are primary prevention programs aimed at changing people's beliefs and attitudes in order to get them to alter their risky behaviors. This is one reason why psychologists have such an intense interest in AIDS.

Beliefs and Social Norms: Psychosocial Contributors to Risky Behaviors

During the past decade, behavioral scientists have made substantial discoveries about the psychology of AIDS and its transmission. For example, initial research in this area revealed that many of the individuals not using condoms were those persons at greatest risk for contracting or transmitting AIDS: homosexuals and intravenous drug users. Why were these persons ignoring warnings from the medical community and not practicing safe sex? One of the reasons involves **social norms**—rules that tell us how to act in social situations. For example, among homosexual men, the greater their reported involvement in social networks whose norms supported using condoms to prevent AIDS transmission, the more likely the men were to engage in such behavior (Fisher & Misovich, 1989).

Beliefs, too, seem to play a role in determining why some groups of people engage in risky behaviors. To illustrate this point, consider a study by Hingson and his colleagues (1990). These researchers assessed whether beliefs about AIDS and about condom use were related to the frequency of unprotected sex among sexually active adolescents. After completing the beliefs questionnaire, all participants were asked to estimate the number of sex partners they had during the past year and the frequency with which they engaged in unprotected sex—definitely a risky proposition. The results showed that beliefs are a very important determinant of behavior. Adolescents who believed (1) they were highly susceptible to AIDS, (2) there is no cure for AIDS, and (3) condoms are effective in preventing AIDS were more likely to report the consistent use of condoms than teenagers who did not share these beliefs.

The results of these studies, and related research, provide valuable information regarding the beliefs and attitudes associated with risky behaviors. Researchers have now begun using this knowledge to develop interventions aimed at changing the behaviors of persons at risk for contracting the HIV. Let's look at several of these interventions.

Developing Effective Interventions to Prevent the Spread of AIDS

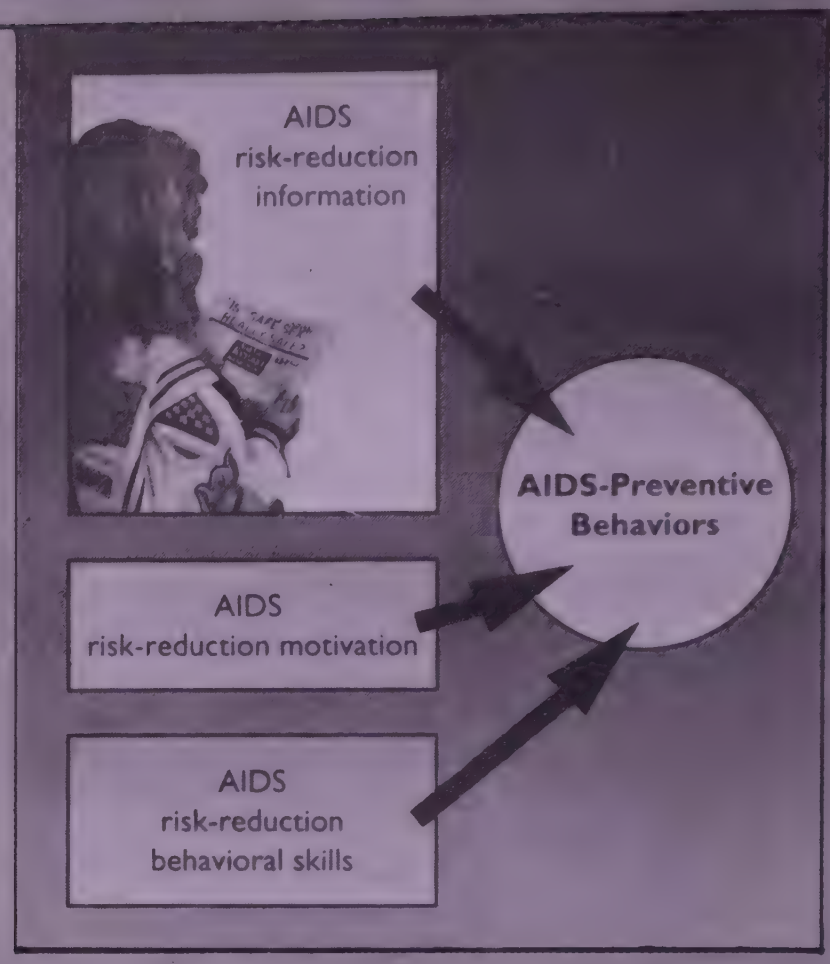
Initial AIDS prevention attempts focused on increasing people's knowledge about the disease and about the behaviors that lead to the spread of HIV. A large-scale illustration of this approach was the U.S. government's massive 1988 educational campaign. A brochure called "Understanding AIDS: A Message from the Surgeon General" was mailed to every household in the United States. In this document the surgeon general provided information about risky behaviors associated with contracting HIV. But is this approach effective in changing people's behavior?

Social Norms: *Rules that tell us how to act in certain social situations.*

FIGURE 13.11

AIDS-Preventive Behaviors: A Model

Growing evidence suggests that prevention programs are more effective when they are tailored to meet the needs of specific target groups and when they provide people with information, motivation, and behavioral skills.
(*Source:* Based on Fisher & Fisher, 1992.)



Most psychologists would agree that increasing people's AIDS-related knowledge is an important ingredient for effecting behavior change. However, evaluations of studies employing this approach alone suggest that it is not sufficient to produce meaningful changes in behavior—especially among groups most at risk for contracting HIV (Fisher & Fisher, 1992).

Researchers now recognize that developing effective AIDS prevention programs is a complicated business and that techniques effective for a particular target group are not necessarily effective for all groups of people. Thus, for each population of interest, it may be important to perform *elicitation* research. This kind of research assesses a given population's existing level of AIDS risk-reduction knowledge; the factors that determine their motivation to reduce AIDS risk; and their existing AIDS prevention behavioral skills, such as the ability to communicate with and to be appropriately assertive with a potential sexual partner (Fisher & Fisher, 1992). Growing evidence suggests that prevention programs that provide not only knowledge but also motivation and behavioral skills are generally more effective in increasing AIDS-preventive behaviors than programs that do not (please refer to Figure 13.11).

Although scientists have greatly improved our understanding of the virus that causes AIDS, there is still no cure in sight. As a result, the role of psychologists in designing effective interventions to change risky behaviors, and thereby to prevent the spread of HIV, will become increasingly important in the decades ahead.

CRITICAL THINKING QUESTIONS

1. Psychologists have shown how social norms and beliefs influence the occurrence of risky behaviors. Can you think of ways this knowledge can be applied to change risky sexual practices?
2. Researchers have developed AIDS prevention programs for high-risk groups, such as homosexual persons and intravenous drug users. Can you think of ways to convince heterosexual persons that they, too, are at risk for AIDS?
3. Do you think the federal government's 1988 decision to mass-mail AIDS informational brochures to citizens throughout the United States was effective in changing their risky sexual practices? If yes, why? If no, why not?
4. Could the money spent on the federal government's campaign have been used more productively? How would you approach designing an effective AIDS prevention program?

PROMOTING WELLNESS: *Developing a Healthier Lifestyle*

Have you ever wondered why some individuals live to be more than one hundred years old, while most people live only sixty or seventy years? Studies of persons who live to be more than one hundred years old indicate that several factors may play a role in their extended life spans. (Chapter 9 addressed many issues relevant to lifestyles of older adults.) One of these factors is diet: Long-lived persons often show a pattern involving greater-than-average consumption of grains, leafy green and root vegetables, fresh milk, and fresh fruits, and they tend to eat low to moderate amounts of meat and animal fat. In addition, they maintain low to moderate levels of daily caloric intake (1,200 to 3,000 calories) and consume only moderate amounts of alcohol each day. Physical activity is perhaps the most important factor contributing to longevity and good health among long-lived people. Many work outdoors and walk a great deal. That is, regular physical activity is an integral part of their lives, continuing well into old age. Additional factors that may contribute to their extended life span are continued sexual activity and continued involvement in family and community affairs during advanced years (please refer to chapter 9).

In sum, while genetic factors certainly play a role in determining life span, a growing body of evidence suggests that people may be able to extend their lives significantly by adhering to a lifestyle that includes the factors mentioned above: a balanced, low-fat, low-calorie diet, regular exercise, and continued activity during later years (Pelletier, 1986).

On the basis of such findings, a growing number of health professionals and psychologists have adopted an approach to health and wellness that is based on **prevention strategies,** techniques designed to reduce the occurrence of illness and other physical and psychological problems. *Primary prevention* is considered the optimal prevention approach. Its goal is to reduce or eliminate altogether the incidence of preventable illness and injury. Primary prevention strategies usually involve one or more of the following components: educating people about the relation between their behaviors and their health, promoting motivation and skills to practice healthy behaviors, and directly modifying poor health practices through intervention. *Secondary prevention* focuses on early detection to decrease the severity of illness that is already present. Thus, individuals learn about their health status through medical tests that screen for the presence of disease. Although early detection of certain diseases is traditionally carried out by health professionals and often requires sophisticated medical tests, exciting research is under way to teach patients methods of self-examination, especially for early detection of breast and testicular cancer.

PRIMARY PREVENTION: *Decreasing the Risks of Illness and Injury*

In most instances, our initial attempts to change our health behaviors are unsuccessful. Typically, we become aware of the need to change behaviors; we initiate change; we experience a series of failed attempts to change these behaviors; and sometimes—only sometimes—we succeed. The nature of this process indicates that we need help—a variety of intervention programs to meet our varied needs and purposes.

Prevention Strategies: *Techniques designed to reduce the occurrence of physical and psychological problems.*

Health Promotion and the Mass Media: Marketing Healthy Lifestyles in the Community We are constantly bombarded with messages about health risks. Numerous nonprofit organizations use television commercials, newspaper articles, magazine ads, and radio advertising to warn us about unhealthy behaviors like smoking, unprotected sex, and alcohol and drug abuse, and their associated risks, including cancer, heart disease, and AIDS. These campaigns typically provide information about symptoms that may indicate the presence of a health problem, such as shortness of breath or chest pains in the case of heart attacks, and information about the relation between specific behaviors and disease; for example, "Smoking is the number one cause of heart disease."

But can mass media campaigns alone produce widespread changes in behavior? There is little evidence that they can (Meyer, Maccoby, & Farquhar, 1980). One reason for the limited success of these programs may be the media's depiction and promotion of unhealthy habits, which counteract health promotion messages. An analysis of food and beverage commercials presented during prime-time television indicates that their messages are inconsistent with recommended dietary guidelines. For example, Story and Faulkner (1990) computed the frequency of commercials advertising healthy versus unhealthy food and beverages. Most of the prime-time commercials are for unhealthy foods and beverages. The clearest example is the difference in numbers of commercials for fast-food versus family-style restaurants. Despite these findings, it is interesting that many companies use health messages to sell their products.

The mass media can be a very effective tool for promoting behavior change, however, when combined with other intervention programs. For example, the Stanford Heart Disease Prevention Project investigated the combined effects of a media campaign and a program designed to change health-related behaviors (Farquhar, Maccoby, & Solomon, 1984). Three communities were chosen for the study. One community received an intense media campaign focusing on the risk factors associated with heart disease; a second group received the same media campaign plus a personal instruction program on modifying health habits for people in high-risk groups; a third community served as a control. Although the media campaign alone produced modest changes in health behavior, the program that included both a media campaign and behavior therapy was most effective. Another successful program, which used a combination of mass media, community antismoking programs, and physician intervention—termed the Quit for Life Project—was able to reduce smoking prevalence in two major cities by 6.5 percent over a four-year period (Pierce et al., 1990).

Some evidence suggests that our beliefs may affect our responses to advertisements. For example, individuals with high fear of contracting AIDS rate advertisements about AIDS as more effective than people with low fear of contracting AIDS (Struckman-Johnson et al., 1990). This finding is consistent with the health belief model described earlier, which predicts that people who believe they are more susceptible to disease will be more likely to accept an advertisement's intended message. During the 1980s and 1990s the mass media have been the primary tool for disseminating information about the AIDS crisis. The spread of information may help explain why sales of condoms recommended specifically for the prevention of AIDS transmission increased dramatically (116 percent) from 1984 to 1988 (Moran et al., 1990).

Overconsumption of Alcohol: Injury Control on the Road One of the biggest public health concerns facing our nation stems from the overconsumption of alcohol. The costs associated with alcohol-related accidents,

crime, and lost production are enormous. Recently, psychologists and other health care experts have begun to recognize the need for primary prevention efforts to deal with alcohol-related problems; efforts that focus, for example, on reducing the chances that someone will drink to excess or drive drunk. This focus on prevention is particularly important for high-risk groups such as college students. It has been estimated that as many as 90 percent of college students consume alcohol to some degree (Kivlahan et al., 1990). Therefore, it is likely that some of these individuals will occasionally drink too much and thus place themselves or someone else at risk if they get behind the wheel of an automobile.

Psychologists have begun to investigate the environments in which drinking takes place, such as private social gatherings and fraternity parties (Geller & Kalsher, 1990; Kalsher et al., 1988). This kind of investigation includes a systematic assessment of environmental determinants of alcohol consumption: factors that tend to increase or decrease actual drinking behavior and the outcome of drinking (blood alcohol concentration) under naturalistic circumstances. Exploration of the environmental determinants of alcohol consumption among college drinkers may lead to practical ways to decrease the level of intoxication at college parties and perhaps, most importantly, to reduce the chances that students will be injured or injure someone else once they leave the party.

The Work of Staying Healthy: Motivating the Couch Potato

Research evidence suggests that only one in five Americans exercises regularly and intensely enough to reduce his or her risk for chronic disease and premature death (Dubbert, 1992). This is surprising, since it is now very well known that regular and vigorous exercise can significantly reduce coronary heart disease, even in the presence of other health risk factors, including smoking, obesity, high blood pressure, and high blood cholesterol (Dishman, 1988). Moreover, some evidence suggests that even less vigorous forms of activity can be beneficial if done consistently. For example, people who walk regularly—at least four hours per week—have less than half the incidence of elevated cholesterol of those who do not (Tucker & Friedman, 1990).

Research also indicates that exercise can have a significant impact on our mental health. For example, exercise has been found to improve self-concept, alleviate feelings of depression, and reduce anxiety (Dubbert, 1992). These effects are particularly apparent just after a workout, but there may also be some benefits from long-term participation in exercise. Changes in mood following exercise may result from socializing and being involved with others (Plante & Rodin, 1990); running with a friend may improve mood because of the companionship the exercise provides. Mood may also improve because of exercise's effect on self-efficacy—enhanced confidence in our ability to perform a behavior, such as running a mile or completing an aerobics workout (Rodin & Plante, 1989).

So how can we get the rest of the couch potatoes off the couch? Some research suggests that starting and then maintaining an exercise program requires that people arrange their environment so that it supports the desired exercise behavior and weakens competing behaviors. First, it is important to arrange effective cues that become a signal to exercise. Working out in

Exercising the Couch Potato

Evidence suggests that regular and vigorous exercise reduces the risk of coronary heart disease.

the same location, doing a similar warm-up routine, and recording and posting the results of one's physical activity can be effective in cueing future exercise behavior. It is also important to arrange when exercise occurs, to minimize the effects of the cues for competing behaviors. For example, individuals who have a tendency to work late should establish a morning training routine to minimize competition with a busy work schedule. Second, it is also important to arrange for consequences that maintain exercise behavior. Initially, it is critical for new exercisers to seek out sources of rewards for their exercise behavior and avoid potential sources of punishment, including muscle soreness, fatigue, and injury. Paradoxically, those most in need of consistent exercise, such as obese or extremely out-of-shape persons or older individuals, may be those most subject to punishing consequences—including the possibility of a heart attack if they overdo it (Curfman, 1993; Knapp, 1988). Finally, the presence of a strong social support network can greatly increase adherence to a lifelong exercise habit.

Secondary Prevention: The Role of Early Detection in Disease and Illness

Psychologists are taking an increasingly active role in developing motivational strategies to get people to take part in *early detection* procedures—techniques used to screen for the presence of high blood pressure, high blood cholesterol, and some forms of cancer. The identification of these conditions at an early stage can make an enormous difference in the chances for treatment success—in some cases the difference between life and death.

Key Points

- The mass media, when combined with other health promotion programs, can have a beneficial impact on our health behaviors.
- By manipulating the social environment, we may be able to affect the amount of alcohol we consume in social situations and reduce the incidence of drunk driving.
- Regular and vigorous exercise promotes both physical and psychological health. Starting and maintaining an exercise habit requires that people arrange their environment in a way that supports the desired exercise behavior and weakens competing behaviors.
- Primary prevention involves educating people about the relation between their behaviors and their health, promoting healthy behaviors, and directly modifying poor health practices.
- Secondary prevention emphasizes early detection to decrease the severity of illness that is already present.

Screening for Disease: Seeking Information about Our Health Status The fact that early detection and treatment of an illness is more effective than later detection and treatment is the foundation for screening programs. Evidence suggests that the widespread use of available screening techniques could decrease the incidence of cardiovascular disease through the early detection of high blood pressure and cholesterol, and could significantly reduce the number of cervical, colon, and prostate cancer deaths. For example, it is estimated that 10 to 20 percent of invasive cervical cancer in females could be prevented by widespread Pap smear testing (Rothenberg et al., 1987).

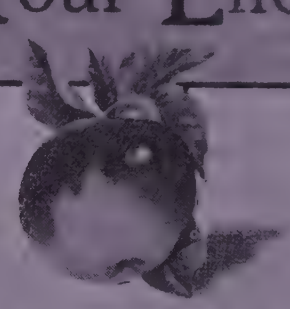
Many companies, colleges, community organizations, and hospitals have screening programs to test for high blood pressure and serum cholesterol. Unfortunately, many people either do not take advantage of screening programs at all or fail to get screened regularly. Indeed, forgetting and underestimating the time since the last test are the primary reasons people wait too long between screenings. Interventions that heighten awareness or serve a reminder function, such as physician reminder systems and local advertising campaigns, can increase the frequency of screening visits (Mitchell, 1988).

The most significant factors governing the use of screening, as indicated by the health belief model, appear to be beliefs about the possible benefits of screening, the perceived severity of possible illnesses, perceived vulnerability to disease, and beliefs about what other people (friends, family) think about screening (Hennig & Knowles, 1990).

Self-Examination: Detecting the Early Signs of Illness Self-examination can be instrumental for the early detection of both testicular and breast cancer. Testicular cancer is among the leading causes of death in men between the ages of fifteen and forty in the United States (Droller, 1980). The cure rate associated with testicular cancer is extremely high—if the cancer is detected early (Dahl, 1985). Unfortunately, in nearly half of the testicular cancers diagnosed, the presence of the disease is not detected until it has spread from the testes to the abdomen and other organs (Cummings et al., 1983), and the chances of a full recovery are significantly less (Bosl et al., 1981). Despite the fact that testicular self-examination techniques are available and are effective in detecting the early signs of cancer, many males are unaware of their existence (Goldenring & Putrell, 1984; Steffen, 1990).

The dangers associated with breast cancer present a similar challenge for females. Some researchers suggest that breast cancers detected early through secondary prevention programs, such as breast self-examination, clinical breast examination, and mammography, have an 85 to 90 percent chance of being cured (American Cancer Society, 1989). Skills training programs for the detection of the symptoms and signs of breast cancer were developed many years before those for testicular self-examination. Interestingly, knowledge of breast self-examination is much greater among females than is knowledge of testicular self-examination among males.

Making Psychology Part of Your Life



Managing Stress: Some Useful Tactics

Stress is a fact of life. It's all around us: at work, in our environment, and in our personal lives. Because stress arises from so many different factors and conditions, it's probably impossible to eliminate it completely. But we *can* apply techniques to lessen its potentially harmful effects (Carver, Scheier, & Weintraub, 1989; Folkman et al., 1986). Let's consider several of these techniques, dividing them into three major categories: *physiological, cognitive,* and *behavioral.*

Physiological Coping Techniques

Common physiological responses to stress include tense muscles, racing pulse, pounding heart, dry mouth, queasy stomach, and sweating. But several coping techniques can be effective.

One of the most effective procedures is learning to reduce the tension in our own muscles through *progressive relaxation* (Jacobson, 1938). To use this technique, begin by alternately flexing and relaxing your muscles to appreciate the difference between relaxed and tense muscles. Next, you might shake out your arms and then let them flop by your sides. Then relax your shoulders by slowly rolling them up and down. Now, relax your neck. Step by step, you extend this process until your body is completely relaxed from head to toe. Controlled breathing is also important. When you are tense, you tend to take in relatively short, shallow breaths. However, as your body slows down during relaxation, notice that your breathing changes to deeper, longer breaths. Relaxation procedures are effective in reducing emotional as well as physical tension. A related technique that is often effective for achieving a relaxed state is *meditation,* described in detail in chapter 4.

Vigorous physical exercise is another important technique for coping with stress and its adverse effects. I've been using this technique myself for more than fifteen years (mainly through running), and it has certainly done wonders for me. I still remember what finally got me started. I was working at the National Science Foundation in Washington, D.C., where my job focused on helping to determine which psychologists would receive research grants. Suddenly, after Ronald Reagan was elected president, the budget for my program was cut by more than 80 percent. As a result, I had to tell many colleagues that

Table 13.3

Getting the Most Out of Your Day: Psychology in Action

One behavioral coping strategy is time management. Here are some tips to help you get the most out of your day.

Basic Principles of Time Management

1. Each day, make a list of things you want to accomplish.
2. Prioritize your list. Plan to do the toughest things first and save the easier tasks for later in the day when you are low on energy.
3. Arrange your work schedule to take best advantage of those hours when you work best.
4. Always set aside a block of time when you can work without any interruptions.
5. Be flexible about changes in your schedule so that you can handle unexpected events.
6. Plan for some leisure activity during your day—everybody needs a break.
7. Set aside some times each day or week in which you always do some planned leisure activity.

their research could no longer be supported. I found being the bearer of ill tidings so stressful that my health was affected. My physician suggested exercise, and he was right. Running didn't solve the serious problems I faced at work, but it certainly increased my capacity to cope with this stress, and definitely made me feel better.

Behavioral Coping Techniques

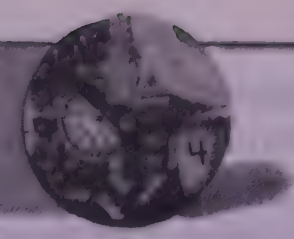
We're all guilty of behaving in ways that bring stress on ourselves. We overload our schedules with too many responsibilities; we procrastinate; it all adds up to stress. There are plenty of things we can do to reduce the stress in our lives. One method is *time management:* learning how to make time work for us instead of against us. Adhering to a well-planned schedule can help us make more efficient use of our time and eliminate behaviors that interfere with our main goals. An important—but often ignored—principle of time management is to balance work time and play time. Table 13.3 offers several tips to help you get the most out of your day.

Cognitive Coping Techniques

We don't always have control over all the stressors in our lives. We *can,* however, gain some control over our cognitive reactions to them. In other words, when exposed to a stressful situation, we can think about it in different ways, and some of these are much more beneficial than others. The process of replacing negative appraisals of stressors with more positive ones is called *cognitive restructuring* (Meichenbaum, 1977). To use this technique successfully, begin by monitoring what you say to yourself during periods of stress. Begin to modify these thoughts by thinking more adaptive thoughts. For example, try to discover something humorous about the situation, or imagine creative ways to reduce or eliminate the source of stress. Also, as mentioned earlier, social support is important. Others—family, friends, or associates—can often help you to restructure stressors (Bruhn & Phillips, 1987): to perceive stressful events as less threatening and more under control than you might otherwise do. As you may recall, cognitive appraisal plays a crucial role in the way we interpret stressors. It's a good idea to be in contact with people who can suggest strategies for dealing with the sources of stress that you might not generate yourself and can help reduce the negative feelings that often accompany stressful events or situations (Costanza, Derlega, & Winstead, 1988).

Research shows that there are a number of steps you can take to help reduce stress, including relaxation, time management, and cognitive restructuring.

Summary and Review of Key Points



Health Psychology: An Overview Key Terms: health psychology, p. 501 lifestyle, p. 501	• The primary aim of health psychology is to determine important relationships between psychological variables and health. A related field, behavioral medicine, combines behavioral and biomedical science knowledge to prevent and treat disorders. Many of today's leading causes of premature death can be attributed to people's lifestyles.
Stress: Its Causes, Effects, and Control Key Terms: stress, p. 503 stressors, p. 503 general adaptation syndrome (GAS), p. 503 posttraumatic stress disorder, p. 510 person-environment (P-E) fit, p. 512 hardiness, p. 518	• Stress is the process that occurs in response to situations or events (stressors) that disrupt, or threaten to disrupt, our physical or psychological functioning. • Selye's general adaptation syndrome (GAS) model helps describe our physiological reactions to stressors. It includes three stages: alarm, resistance, and exhaustion. • Cognitive appraisals play an important role in determining whether an event will be interpreted as stressful or as a challenge. • Stressors can be major life events, such as the death of a spouse, or daily hassles—minor irritations of everyday life. • Unusually stressful natural and human-produced disasters can often produce severe psychological problems termed posttraumatic stress disorder. • Among sources of work-related stress are work overload and underload, role conflict, and performance appraisals. • Stress may play a role in 50 to 70 percent of all physical illness, primarily through its effect on our immune system. Even relatively low levels of stress may interfere with task performance. • Persons who experience prolonged exposure to high levels of stress may experience burnout. • Two personal characteristics that influence reactions to stress are optimism and hardiness. Optimists adopt more effective tactics for dealing with their stressors than pessimists. Hardy persons show high levels of commitment, view change as an opportunity for growth, and have a sense of control over events in their lives.
Understanding and Communicating Our Health Needs Key Term: health belief model, p. 519	• Symptoms, or sensations such as irregularities in our heartbeat, are useful because they may reflect an underlying medical problem. • The health belief model suggests that our willingness to make lifestyle changes or seek medical help depends on our beliefs concerning our susceptibility to an illness, the severity of the illness, and the effectiveness of taking steps to deal with it. • Doctors are often more effective in handling technical information than psychosocial concerns. Interventions designed to improve doctor-patient communication have a beneficial impact on patient satisfaction and the accuracy of diagnosis.

Behavioral and Psychological Correlates of Illness: The Effects of Thoughts and Actions on Health Key Terms: cancer, p. 522 risk factors, p. 523 carcinogens, p. 523 cardiovascular disease, p. 523 nicotine, p. 523 passive smoking, p. 526 serum cholesterol, p. 527 hypertension, p. 528 Type A behavior pattern, p. 528 acquired immune deficiency syndrome (AIDS), p. 529 social norms, p. 531	• Cancer is actually a group of diseases characterized by a loss of some cells' ability to function normally. These cells typically multiply rapidly, generating tumors. • Individual differences in people's reaction to nicotine, the addictive substance in tobacco, help determine who will become a smoker. • Both smoking and passive smoking are implicated in many cancers, in cardiovascular diseases, and in sickness among children. Poor diet can raise our risks of cancer of the colon and rectum, breast cancer, and cardiovascular disease. Heavy drinking can cause diseases of the stomach, liver, and intestines. It can also impair mental and sexual functioning, and it can result in fetal alcohol syndrome. • Inadequate emotional expression can adversely affect the progression of cancer. Emotions also affect high blood pressure. • Persons who tend to be competitive, aggressive, hostile, and impatient are displaying a pattern of behaviors termed Type A. Cynical hostility puts Type A persons most at risk for heart attacks. • Acquired immune deficiency syndrome (AIDS) is a reduction in the immune system's ability to defend itself against foreign matter. AIDS is transmitted primarily through unprotected sex and infected blood.
Promoting Wellness: Developing a Healthier Lifestyle Key Term: prevention strategies, p. 533	• The mass media, when combined with other health promotion programs, can be an effective tool for promoting behavior change. • Understanding features of party environments may help us devise practical and effective techniques to decrease the amount of alcohol we consume in social situations and reduce the incidence of drunk driving. • Regular and vigorous exercise promotes both physical and psychological health. Starting and maintaining an exercise habit requires that people arrange their environment in a way that supports the desired exercise behavior and weakens competing behaviors. • Primary prevention involves educating people about the relation between their behaviors and their health, promoting healthy behaviors, and directly modifying poor health practices. Secondary prevention strategies emphasize early detection to decrease the severity of illness that is already present.

Critical Thinking Questions

Appraisal	Throughout this chapter we've seen that lifestyle factors—what we choose to eat, drink, or smoke, and whether we choose to exercise regularly—greatly influence our health. If one can achieve good health simply by changing one's own behaviors, then why aren't more people doing so?
Controversy	The number of persons infected with HIV in the United States and throughout the world is increasing at an alarming rate. Since it is clear that many infections result from unprotected sex with an infected person, behavioral researchers have developed interventions that effectively promote the use of condoms—particularly among high-risk populations. Others argue, however, that these interventions simply promote promiscuity and thereby worsen the problem. Which perspective is correct? What are your views on this issue?
Making Psychology Part of Your Life	Now that you know something about the many practices that can improve physical and psychological health, will you be more likely to follow these practices yourself? Why or why not?

Psychological Disorders:

Their Nature and Causes

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14

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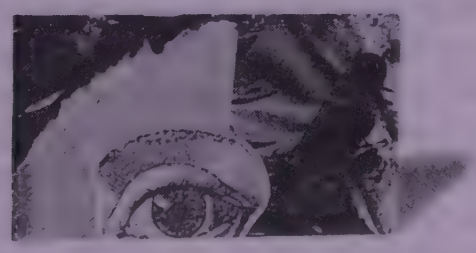


Think back over all the people you have known. Can you remember ones who experienced any of the following problems?

- Wild swings in mood, from deep despair to the heights of elation
- Excessive dependence on alcohol, tranquilizers, or other drugs

- Intense and seemingly unjustifiable fear of certain situations, such as being in a crowd, being alone, or traveling by airplane
- Unusual preoccupation with illness health, and various (perhaps largely imaginary) symptoms
- Tremendous concern about being overweight, coupled with a near-starvation diet and an emaciated body

If you *haven't* known someone who experienced one or more of these problems, then you have certainly led a charmed life, for disorders like these are experienced by many millions of human beings in every corner of the earth every year. It is on these and other **psychological disorders**—maladaptive patterns of behavior and thought that cause the persons who experience them considerable distress—that we will focus in this chapter and chapter 15.

THERE APPEAR TO BE NO SIMPLE WAYS OF DISTINGUISHING ABNORMAL BEHAVIOR FROM NORMAL BEHAVIOR. THE TWO LIE ON A CONTINUUM.

But, what, precisely, are such disorders? I have just offered a brief definition, but it is far from complete. In fact, psychologists and other professionals concerned with psychological disorders have debated this question for decades, for there appear to be no simple ways of distinguishing *abnormal* behavior from *normal* behavior. The two lie on a continuum, and one often shades into the other. Most psychologists agree, however, that psychological disorders (and, by extension, all forms of behavior described as "abnormal") often share some, if not all, of the following features.

PSYCHOLOGICAL DISORDERS: ATYPICAL AND MALADAPTIVE

Is the homeless man shown here suffering from a psychological disorder? We can't be sure without careful diagnosis, but his behavior certainly meets some of the key criteria defining such disorders.

First, these disorders usually generate *distress*—anxiety, internal conflict depression, confusion, and other negative feelings—in the persons who experience them. Second, psychological disorders involve patterns of behavior or thought that are judged to be unusual or *atypical*. People with these disorders don't behave or think like most others in their society, and this fact is noticed—often with discomfort—by the persons around them. Third, psychological disorders involve behaviors that are *maladaptive*—ones that interfere with individuals' ability to function normally and to meet the demands of daily life. People suffering from such disorders find it difficult to carry out their work, to interact with friends or strangers, to meet family obligations, or to accomplish the countless small tasks of daily life.

Finally, psychological disorders are associated with behavior that is evaluated negatively by the members of a particular society. In other words, persons suffering from such disorders often behave in ways that are viewed as objectionable or unacceptable by the people around them. Of course, ideas about what forms of behavior are acceptable and what forms are unacceptable can and often do vary between cultures, and can also change greatly within the same culture over time. For example, when I was in college in the early 1960s, a young man who pierced his ears and wore two or more earrings would have been viewed as strange indeed. Today, such adornments hardly receive a second glance on most campuses; what might have been labeled as weird or abnormal in the 1960s is nothing out of the ordinary today.

Taking these points into account, we can define psychological disorders as *patterns of behavior and thought that are atypical, that are viewed as undesirable or unacceptable within a given culture, that are maladaptive, and that usually (although not always) cause the persons who demonstrate them considerable distress.* As I have already noted, such problems are far from rare. In fact, recent surveys indicate that perhaps as many as half of all human beings experience a psychological disorder at some point during their lives (Kessler, 1994; Robins & Regier, 1991). Fortunately, this need not be cause for alarm; as we will see in chapter 15, many effective techniques for dealing with such difficulties exist and can greatly reduce their negative effects.

Psychological Disorders: *Behaviors or thoughts that are unusual in a given society, that are maladaptive, and that cause the persons who experience them considerable distress.*

In the present chapter, we'll consider a number of different psychological disorders. Before turning to specific disorders, however, it's essential to complete two preliminary tasks. First, we'll review contrasting perspectives on the nature of psychological disorders and indicate how views concerning such disorders have changed over the centuries. Second, we'll examine a widely used system for diagnosing various psychological disorders—the *DSM-IV*. After that, we'll turn to psychological disorders themselves, considering both the symptoms they produce and potential causes for their occurrence.

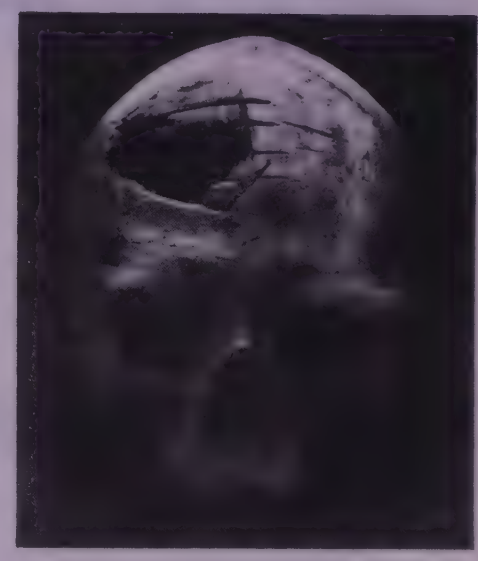
Changing Conceptions of Psychological Disorders: A Brief Historical Perspective

Are psychological disorders a product of the stress and turmoil of modern life? Existing evidence suggests that, in fact, such disorders existed long before the dawn of civilization. Stone Age skulls containing neatly drilled holes have been uncovered by archaeologists in Europe and South America. One colorful explanation for such operations, known as **trephining**, is that they were performed to permit the escape of evil spirits that, it was believed, were causing certain people to behave in bizarre ways (Maher & Maher, 1985). However, it is also possible that such operations were performed simply to treat various types of head injuries. The fact that most skulls showing trephining are those of adult males—the members of primitive societies most likely to be injured by accidents or warfare—suggests that this less colorful interpretation may actually be correct. Still, there is indirect evidence that psychological disorders existed even in the distant past, and that people in primitive societies attempted to deal with these problems as best they could.

From Demons to Disease: Changing Concepts of Abnormal Behavior

While the precise meaning of the holes in ancient skulls is open to interpretation, the earliest written descriptions of psychological disorders are clear as to the causes of these maladies: They lay the blame for such disorders squarely on supernatural forces. In societies ranging from China to ancient Babylon, possession by demons or evil spirits was the explanation commonly accepted for bizarre forms of behavior. While such views of abnormal behavior persisted for many centuries, the ancient Greeks developed a radically different perspective—the belief that mental disorders stemmed primarily from *natural* causes. Several centuries before the birth of Christ, Hippocrates, a famous physician, suggested that all forms of disease, including mental illness, had natural causes. He attributed psychological disorders to such factors as brain damage, heredity, and imbalances within the body.

This view of abnormal behavior was maintained in Western societies until the fall of the Roman empire. Then it was replaced once again by the idea that abnormal patterns of behavior had supernatural causes such as demonic possession and witchcraft. While there is some indication that abnormal behavior was sometimes seen as stemming from more ordinary factors, such as injuries to the head or the effects of high fevers, acceptance of the view that it was often caused by supernatural forces persisted into the fifteenth and sixteenth centuries. Indeed, even during the Renaissance, a period of dazzling



Trephining: Early Treatment for Psychological Disorders?

Stone Age skulls with neatly drilled holes may provide an example of early psychological treatment—or they may be the result of medical procedures for treating various types of head injuries.

Trephining: *An ancient surgical procedure in which holes are cut into the skull.*

advances in European art, music, and science, the supernatural theory persisted. It was during the fifteenth and sixteenth centuries—the heart of the Renaissance—that more than 100,000 people in Europe were convicted of being witches and executed for their supposed crimes (Deutsch, 1949). While some of these executions were probably carried out for political or economic reasons, it appears that many of the victims were persons whose only crime was bizarre or unusual behavior stemming from psychological problems.

Gradually, however, the scientific approach first established by the Greeks reemerged. This led many scholars and physicians to search for the roots of abnormal behavior in natural causes. The result was a shift toward the idea that psychological disorders are a form of illness or disease, a perspective that remains highly influential today.

Humane Treatment of People with Psychological Disorders

Until the eighteenth century, people suffering from psychological disorders were subject to harsh conditions. Philippe Pinel was one reformer who introduced more humane procedures in a large Paris hospital, with very positive results.

The Biological/Medical Perspective: Psychological Disorders as Disease

Prior to the eighteenth century, persons suffering from mental disorders were often subjected to harsh "treatment." Patients in so-called mental hospitals were shackled to walls in dark, unlighted cells that they were never permitted to leave. Sanitation was primitive or nonexistent, and little if any attention was paid to diet.

But change was in the wind. Disturbed by these conditions, Jean-Baptiste Pussin, superintendent of a large hospital in Paris, established new and more humane rules for the treatment of inmates. No beatings were allowed, and patients who had been chained for years were freed from their shackles in the hope that they would become more manageable. Many *did* respond favorably to this improved treatment, so the reforms were continued by Philippe Pinel, who became chief physician of the hospital's ward for the mentally ill in 1793. Like Pussin, Pinel believed that psychologically disturbed persons were suffering from a form of illness, and that moving them from dungeons to bright, sunny rooms and treating them with kindness rather than violence would help them to recover. The results were impressive: Many patients (those, we must assume, who were less seriously disturbed) responded to this new treatment with rapid improvements. Indeed, many recovered to the point where they could be released—some after decades of confinement.

Similar actions by enlightened physicians in other nations produced parallel encouraging results. The view that abnormal behavior is the result of *mental illness* gradually gained in strength until it was, at least in Western nations, the dominant approach. This **medical perspective** remains highly influential today. Indeed, it is the basis for the field of **psychiatry**, a branch of modern medicine specializing in the treatment of psychological disorders.

Medical Perspective: The view that psychological disorders have a biological basis and should be viewed as treatable diseases.

Psychiatry: A branch of medicine that focuses on the diagnosis and treatment of psychological disorders.

Within psychology, there is less emphasis on abnormal behavior as a disease and more on its potential *biological* or *biochemical bases* (e.g. Cromwell, 1992; Heinrichs, 1993). Evidence suggests that changes in the structure or functioning of the brain may play an important role in several forms of abnormal behavior (Raz, 1993). It also appears that the tendency to develop some psychological disorders may be inherited (Faraone, Kremen, & Tsuang, 1990). Thus, while many psychologists prefer to avoid describing psychological disorders in strictly medical terms—as diseases requiring treatment—they

do accept the view that such disorders often involve or stem from biological causes.

THE PSYCHODYNAMIC PERSPECTIVE: *Desires, Anxieties, and Defenses*

A very different perspective on abnormal behavior was offered by Freud and several other important figures in the history of psychology. According to this *psychodynamic perspective*, which we discussed in detail in chapter 12, many mental disorders can be traced to unconscious urges or impulses and to the struggle over their expression that takes place in the hidden depths of human personality. Remember that in Freud's theory the *id* (repository of our primitive desires) demands instant gratification, while the *superego* (conscience) denies it. The *ego* (consciousness) must strive to maintain a balance between these forces. According to Freud, mental disorders arise when the ego, sensing that it may soon be overwhelmed by the id, experiences *anxiety*. To cope with such anxiety, the ego employs different *defense mechanisms*, as described in chapter 12. These serve to disguise the nature of the unacceptable impulses and so reduce the anxiety experienced by the ego; but they may also generate maladaptive behavior.

While few psychologists currently accept Freud's views about the origins of psychological disorders, his suggestion that unconscious thoughts or impulses can play a role in abnormal behavior remains influential. Thus, in this respect, the psychodynamic perspective has contributed to our modern understanding of abnormal behavior.

THE MODERN PSYCHOLOGICAL APPROACH: *Recognizing the Multiple Roots of Abnormal Behavior*

"Mental illness" is a term that makes some psychologists uneasy. Why? Because it implies acceptance of the medical model described above. To call an individual "mentally ill" implies that her or his problems constitute a disease that can be cured through appropriate medical treatment. In one respect, this view makes sense: As I have noted, many psychological problems do seem to have a biological basis. In another sense, though, the medical perspective is somewhat misleading. Decades of research suggest that full understanding of many psychological disorders requires careful attention to *psychological* processes such as learning, perception, and cognition, *plus* recognition of the complex interplay between environmental influences and heredity that seems to affect all forms of behavior.

For example, consider what is perhaps the most common form of psychological disorder—*depression*—which involves intense sadness, lack of energy, and feelings of hopelessness and despair. What are the roots of this complex problem? Evidence suggests that biochemical and genetic factors probably play an important role (Henriques & Davidson, 1990). But so, too, do cognitive and social factors. As we'll see in more detail later in this chapter, depressed persons seem to process information about the external world differently from nondepressed persons; they are, for example, much more likely to notice negative information (Segall, 1988) and to hold unfavorable percep-

KEY POINTS

- Ideas concerning the nature of abnormal behavior have changed greatly over the centuries. Psychological disorders were viewed largely as the result of supernatural forces until well into the eighteenth century.
- The supernatural approach was replaced by the medical model, which sees psychological disorders as forms of mental illness.
- Psychologists recognize the importance of biological factors in many forms of abnormal behavior, but they also emphasize the importance of psychological processes such as cognition and learning, and the impact of sociocultural factors.

Cultural Factors and Abnormal Behavior

Normal behavior in one culture may be considered abnormal in another. The Ashura ritual, practiced in the Middle East, involves self flagellation, a behavior that many other cultures would consider abnormal.

tions of themselves and others (Gara et al., 1993). Taking account of these factors adds appreciably to our understanding of the nature of depression and also suggests effective new ways of treating this disorder.

Finally, most psychologists also attach considerable importance to *social* or *cultural factors* in their efforts to understand abnormal behavior. Some disorders—especially those that are quite severe—appear to be universal, occurring in all or most cultures (Al-Issa, 1982). Others, however, vary greatly across cultures in terms of frequency, severity, and precise form. For example, depression appears to be more common in Western nations than in Asian ones (Kleinman, 1986). Moreover, some disorders seem to be restricted to specific cultures. In isolated rural areas of Japan, for instance, some individuals suffer from a disorder known as *kitsunetsuki*—the belief that they are possessed by foxes; this problem is largely unknown elsewhere. While the role of biological factors should not be overlooked in such disorders, it seems likely that cultural beliefs, values, and conditions play a key role in their occurrence and specific form.

In sum, as Figure 14.1 shows, the modern psychological perspective on abnormal behavior suggests that such problems can best be understood in

FIGURE 14.1

Abnormal Behavior: A Psychological Perspective

Psychologists believe that in order to understand the nature and origins of abnormal behavior, we must take careful account of biological, psychological, and sociocultural factors.

terms of complex and often subtle interactions between biological, psychological, and sociocultural factors. This perspective is certainly more complex than one that views such disorders as biologically produced mental illnesses. However, as we'll discover in later sections of this chapter, it is probably also considerably more accurate. Please see the **Key Concept** on page 550 for an overview of contrasting perspectives on abnormal behavior.

Identifying Psychological Disorders: The DSM-IV

No physician would attempt to treat a common cold through surgery or internal injuries with a Band-Aid. The first and often most crucial step in medical practice is *diagnosis*—identifying the nature of the problem that brought the patient to the doctor's office in the first place. Even if we do not choose to view psychological disorders as medical illnesses, the need to identify such problems in a clear and reliable manner remains. Without an agreed-upon system of *classification*, different psychologists or psychiatrists might refer to the same disorder with different terms or might use the same term to describe very different problems (Millon, 1991).

Recognizing these issues, the American Psychiatric Association has for many years published guides for the diagnosis of mental disorders. These guides or manuals are primarily *descriptive* in nature; they are designed to help practitioners recognize and correctly identify (diagnose) specific disorders. The most recent edition of this guide is the **Diagnostic and Statistical Manual of Mental Disorders-IV** (or *DSM-IV* for short) (American Psychiatric Association, 1993). The major diagnostic categories of the DSM-IV are shown in Table 14.1 (on page 551). Within the manual, hundreds of specific disorders are described. These descriptions focus on observable features and include *diagnostic features*—symptoms that must be present before an individual is diagnosed as suffering from a particular problem. In addition, the manual includes information on *associated features and disorders*—clinical features that are frequently associated with the disorder but not considered essential to its diagnosis; *associated laboratory findings* and *physical examination signs*—biological factors associated with the condition; and information on *age-related, culture-related,* and *gender-related features*—variations in each disorder that may be related to age, cultural background, and gender.

Another important feature of the DSM-IV is that it classifies disorders along five *axes*, rather than merely assigning them to a given category. One of these (Axis I) relates to major disorders themselves. Another (Axis II) relates to what are known as *personality disorders*—maladaptive aspects of personality that exert powerful effects on individuals' behavior and lives. (We'll return to this topic in a later section.) A third axis pertains to general medical conditions relevant to each disorder, while a fourth axis considers psychosocial and environmental problems that may affect the diagnosis, treatment, or prognosis of various disorders. Finally, a fifth axis relates to a global assessment of current functioning. By evaluating people along these various axes, the DSM-IV offers a fuller and more sophisticated picture of individuals' current psychological condition than earlier systems of diagnosis.

Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV): *The latest version of a manual widely used for diagnosing various psychological disorders.*

How does the DSM-IV differ from earlier versions of the DSM? In several important respects. Perhaps most important, it is the first version of the DSM to which psychologists have had major input (Barlow, 1991). Partly as a result

Key Concept

Contrasting Perspectives on Abnormal Behavior

Supernatural View

Abnormal behavior stems from supernatural causes—possession by demons, evil spirits, goddesses, or gods. This view was popular in ancient times, lost favor in the civilizations of Greece and Rome, and then had a resurgence during the Middle Ages.

Some evidence indicates that many of the persons burned at the stake during the fifteenth and sixteenth centuries because they were thought to be witches were actually suffering from psychological disorders.

Psychodynamic View

Abnormal behavior stems from hidden inner forces: conflict between unconscious impulses and aspects of personality that restrain them. This view, which was strongly supported by Freud, remains influential today.

Medical Model

Abnormal behavior is a treatable disease that, like other diseases, stems from biological causes. This perspective serves as the foundation for the field of psychiatry.

Electroconvulsive therapy, which involves the delivery of strong shocks to the patient's head, reflects the view that psychological disorders stem primarily from biological causes.

Modern Psychological View

Abnormal behavior stems from multiple causes. These include *psychological factors* such as learning, perception, and cognition; *sociocultural factors;* and *biological factors.* This view is more complex than earlier perspectives on psychological disorders, but most psychologists believe that it provides a more accurate account of the nature and origins of such problems.

Diagnostic Category	Examples
Disorders usually first diagnosed in infancy, childhood, or adolescence	Mental retardation, learning disorders, disruptive behavior
Delerium, dementia, and other cognitive disorders	Disturbance of consciousness
Mental disorders due to a general medical condition	Delerium due to a high fever
Substance-related disorders	Alcohol dependence, amphetamine dependence, cocaine-use disorders
Schizophrenia and other psychotic disorders	Schizophrenia, delusional disorder
Mood disorders	Depression, bipolar disorders
Anxiety disorders	Panic attacks, agoraphobia
Somatoform disorders	Somatization disorder, conversion disorder
Factitious disorders	Intentional feigning of symptoms
Dissociative disorders	Dissociative amnesia, dissociative fugue, dissociative identity disorder (multiple personality disorder)
Sexual and gender identity disorders	Sexual desire disorders, sexual arousal disorders, paraphilias
Eating disorders	Anorexia nervosa, bulimia nervosa
Sleep disorders	Primary insomnia, nightmare disorder
Impulse control disorders not elsewhere classified	Intermittent explosive disorder, kleptomania, pathological gambling
Adjustment disorder	Development of emotional or behavioral symptoms in response to an identifiable stressor
Personality disorders	Paranoid personality disorder, schizoid personality disorder, antisocial personality disorder
Other conditions that may be a focus of clinical attention	Medication-induced movement disorders, problems related to abuse or neglect

Table 14.1

Major Diagnostic Categories of the DSM-IV

The DSM-IV classifies psychological disorders according to the categories listed here.

of this fact, and partly as a result of changes within psychiatry, strenuous efforts were made to base the DSM-IV more firmly than ever on empirical evidence concerning the nature and prevalence of psychological disorders. Thus, the task force of psychiatrists, psychologists, and other professionals who worked on this new version drew heavily on published studies and reanalysis of existing data in order to refine descriptions of each disorder. The task force also conducted special field trials in which they compared new descriptions and categories with existing ones to determine if proposed changes would indeed improve the reliability of diagnosis—the consistency with which specific disorders could be identified. On the basis of these procedures, many changes were made in the DSM-IV—changes intended to assist psychiatrists and psychologists in accurately recognizing, and therefore effectively treating, a wide range of psychological disorders.

Additional changes in the DSM-IV reflect efforts to take fuller account of the potential role of cultural factors in psychological disorders. Information

on these changes is presented in the **Perspectives on Diversity** section below. One further point: it is important to realize that the DSM-IV merely describes various disorders; it makes no attempt to explain them. This is deliberate, for the DSM-IV is designed to be neutral with respect to theories about the origins of psychological disorders. But since psychology, as a science, seeks *explanation*, not simply description, many psychologists view this aspect of the DSM-IV as a shortcoming that limits its value.

PERSPECTIVES ON DIVERSITY

Taking Account of Cultural Factors in Psychological Disorders: Improvements in the DSM-IV

There is little doubt that some psychological disorders take much the same form throughout the world. Depressed persons, for example, demonstrate negative moods, lack of energy, and feelings of hopelessness no matter where they happen to live and regardless of the specific cultural group to which they belong. But in many cases, cultural factors *are* reflected in psychological disorders in important ways. The specific symptoms shown by individuals, the terms in which they describe their discomfort, and even the frequency of various types of disorder can differ appreciably from one culture to another (American Psychiatric Association, 1993). This is an important point, because the DSM-IV, like earlier versions of the DSM, will be used all over the world, and with persons from highly diverse backgrounds and societies (Maser, Kaelber, & Weise, 1991). Thus, it is crucial that professionals using the DSM be aware of and sensitive to these cultural differences.

The DSM-IV attempts to foster this crucial awareness in several different ways. First, a new section of the description of each disorder focuses on *culturally related features*. Culturally specific symptoms, ways of describing distress, and similar information are included whenever available. This information is designed to help professionals recognize the many ways in which an individual's culture can influence the form of psychological disorders.

CULTURE AND THE DIAGNOSIS OF PSYCHOLOGICAL DISORDERS

Clinical judgments about psychological disorders can be influenced by cultural factors, including differences in ethnic or racial background between therapists and clients. Such factors are given increased attention in the DSM-IV.

Second, certain disorders that seem to appear only in specific cultures are described where they are relevant. For example, do you remember *kitsunetsuki*—the belief, among certain villagers in rural areas of Japan, that they are possessed by foxes? Such disorders are included in the descriptions of various psychological disorders to which they seem to be related. Third, a new appendix describes culture-bound disorders. As stated by the task force charged with developing the DSM-IV: "It is hoped that these new features will increase sensitivity to variations in how mental disorders present in different cultures and will reduce the possible effect of unintended bias stemming from the clinician's own cultural background" (American Psychiatric Association, 1993, p. A:11).

This is a valuable goal, because some evidence suggests that a psychologist's or psychiatrist's cultural background *can* sometimes influence clinical judgment. In the past, most research designed to uncover *clinical bias* focused on *overpathologizing*—the tendency to perceive women, blacks, and other disadvantaged groups as being more disturbed than they actually are. Such

research yielded little evidence for this type of bias (e.g., Abramowitz & Murray, 1983). However, more recent research has examined clinical diagnoses for signs of an opposite form of bias—a tendency to diagnosis members of nonmale, nonwhite groups as showing *less* disturbance than they actually do. For example, depression may be perceived as more "normal" among women than among men, and drug abuse may be perceived as more "normal" among blacks than among whites, with the result that these disorders (depression and substance abuse) are perceived as less serious than they actually are, or are less likely to be recognized when they do in fact exist.

In recent research applying this broadened definition of clinical bias, Lopez (1989) has found considerable evidence for its existence. These findings suggest that important clinical judgments can sometimes be influenced by culture gaps between psychologists or psychiatrists and the persons they seek to help. Certainly such effects don't often arise from overt prejudice or bias on the part of clinicians; rather, they probably stem from the influence of unconscious assumptions or the kind of errors in memory and judgment we encountered in chapters 6 and 7. Whatever their origins, however, culturally related errors in the diagnosis of psychological disorders can have adverse effects on persons belonging to disadvantaged groups—persons who need all the help they can get. Thus, efforts to increase cultural sensitivity in the DSM-IV and other diagnostic procedures seem to be necessary as well as timely.

Describing Psychological Disorders: An Explanatory Note

As I mentioned earlier, the DSM-IV lists and describes literally hundreds of different psychological disorders. All of these are important, but space limitations make it impossible to cover all of them here. Instead, therefore, we'll focus on those disorders that are most common and hence have received most attention in systematic research by psychologists. In discussing these disorders, I'll generally follow the order in which they are described in the DSM-IV, with one major exception: I'll reserve discussion of what is in some ways the most serious disorder, *schizophrenia,* for a final section.

Key Points

- In order to improve the accuracy with which psychological disorders are diagnosed, many professionals in the mental health field use the Diagnostic and Statistical Manual.
- The DSM-IV represents an improvement over earlier versions in several respects, including a firmer basis in published research.
- The DSM-IV provides descriptions of a wide range of psychological disorders and associated conditions. It uses a multiaxial approach in which disorders are classified along five different axes.
- In contrast to earlier versions, the DSM-IV directs increased attention to the impact of cultural factors on psychological disorders.

Mood Disorders: The Downs and Ups of Life

Everyone experiences swings in mood or emotional state—these are a normal part of life. For most people, extreme moods are short-lived; most of the time, they find themselves somewhere in between feelings of elation and of sadness or despair. But in contrast to this typical pattern, some persons experience disturbances in mood that are both extreme and prolonged. Their highs are higher, their lows are lower, and the periods they spend at these emotional heights and depths are lengthy. Such persons are described as suf-

fering from **mood disorders**, which the DSM-IV describes under two major categories: depressive disorders and bipolar disorders.

Depressive Disorders: Probing the Depths of Despair

Unless we lead a truly charmed existence, our daily lives bring some events that make us feel sad or disappointed. An unexpectedly poor grade, breaking up with one's lover or spouse, failure to get a promotion or a raise—these and countless other events tip our emotional balance toward sadness. When do such reactions constitute depression? Most psychologists agree that several criteria are useful for reaching this decision.

First, persons suffering from **depression** experience truly profound unhappiness, and they experience it much of the time. Second, persons experiencing depression report that they have lost interest in all the usual pleasures of life. Eating, sex, sports, hobbies—all fail to provide the enjoyment and satisfaction people expect and, usually, derive from them. Third, persons suffering from depression experience major loss of energy. Everything becomes an effort, and feelings of exhaustion are common. Additional symptoms of depression include loss of appetite, followed by actual loss of weight; disturbances of sleep; difficulties in thinking—depressed people are indecisive and find that they cannot think, concentrate, or remember; recurrent thoughts of death; feelings of worthlessness or excessive guilt; and frequent feelings of agitation. As one depressed person described it:

> I began not to be able to manage . . . the kinds of things I really had always been able to do easily, such as cook, wash, take care of the children, play games. . . . Another thing that was frightening to me was that I couldn't read any more. And if awakened early, I sometimes would lie in bed two hours trying to make myself get up. . . . Then when I did, I felt that I couldn't get dressed. And whatever the next step was, I felt I couldn't do that either . . . (Educational Broadcasting Corporation, 1975).

When individuals experience five or more of these symptoms at once, they are classified by the DSM-IV as showing a *major depressive episode.*

Unfortunately, depression is all too common. It is by far the most frequent type of psychological disorder, although, for reasons that are not yet entirely clear, it is considerably more common among women than among men (Nolen-Hoeksema, 1987).

Bipolar Disorders: Riding the Emotional Roller-Coaster

If depression is the emotional black hole of life, then **bipolar disorder** is its emotional roller-coaster. People suffering from bipolar disorder experience wide swings in mood. They move, over varying periods of time, between deep depression and an emotional state known as *mania,* in which they are extremely excited, elated, and energetic. During manic periods, such persons speak rapidly, show a sharply decreased need for sleep, jump from one idea or activity to another, and show excessive involvement in pleasurable activities that have a high potential for painful consequences; for example, they may engage in uncontrolled buying sprees or make extremely risky investments. Clearly, bipolar disorders are very disruptive not only to the individuals who experience them but to other people in their lives as well.

Mood Disorders: *Psychological disorders involving intense and prolonged mood shifts.*

Depression: *A psychological disorder involving intense feelings of sadness, lack of energy, and feelings of hopelessness and despair.*

Bipolar Disorder: *A mood disorder involving swings between depression and mania.*

The Causes of Depression: Its Biological and Psychological Roots

Depression and other mood disorders tend to run in families (Egeland et al., 1987). Thus, if one identical twin experiences depression, the other has a substantial (perhaps as much as 40 percent) chance of developing a similar disorder. In contrast, among nonidentical twins, who don't share all of the same genes, this figure drops to 20 percent (Kolata, 1986).

Other findings suggest that mood disorders may involve abnormalities in brain biochemistry. For example, it has been found that levels of two neurotransmitters, *norepinephrine* and *serotonin*, are lower in the brains of depressed than in those of nondepressed persons. Similarly, levels of such substances are higher in the brains of persons demonstrating mania. Further, when persons who have recovered from depression undergo procedures that reduce the levels of serotonin in their brains, their depressive symptoms return within twenty-four hours (Delgado et al., 1990). Finally, drugs that produce depression as a side effect—such as reserpine, used in the treatment of high blood pressure—tend to reduce concentrations of norepinephrine, while drugs that counter depression act to increase brain levels of norepinephrine (Whybrow et al., 1984).

Unfortunately, this relatively neat picture is complicated by the following facts: Not all persons suffering from depression show reduced levels of norepinephrine or serotonin; and not all persons demonstrating mania have increased levels of these neurotransmitters. In addition, drugs used to treat both types of disorders produce many effects in addition to changing the presence or activity of these neurotransmitters. At present, then, it is clear that biological factors play a role in depression, but the precise nature of these effects remains to be determined.

While growing evidence indicates that depression involves subtle changes in biochemical processes, additional findings point to the importance of psychological mechanisms in this disorder. One of these is known as **learned helplessness** (Seligman, 1975). When individuals are exposed to situations in which they cannot control their own outcomes, they often develop negative expectancies: they conclude that nothing they do really matters and that no actions on their part will permit them to avoid unpleasant outcomes. It is a short step from such beliefs to serious feelings of depression.

An important addition to this learned-helplessness view of depression concerns individuals' *attributions* about the causes behind such lack of control (Abramson, Seligman, & Teasdale, 1978; Alloy et al., 1988). According to this modified theory, sometimes known as the *hopelessness model*, depression is related not simply to the belief that one cannot influence one's outcomes, but also to the tendency to attribute unfavorable events to stable internal causes. In other words, when negative events happen to depressed persons, they take the blame for their occurrence; they attribute the events to their own lasting shortcomings, such as lack of intelligence, laziness, poor judgment, and so on (Seligman et al., 1988).

Another factor that appears to play a crucial role in depression is the negative views that depressed persons seem to hold about themselves (Beck, 1976; Beck et al., 1979). Individuals suffering from depression seem to possess negative **self-schemas**—negative conceptions of their own characteristics, abilities, and behavior. As a result of negative self-schemas, depressed persons tend to be exquisitely sensitive to negative information about themselves; for example, negative feedback from others (Bradley & Mathews, 1983). This, in turn, often leads them excessively to seek reassurance from others that those persons "truly care" about them. As you can readily guess, these repeated

Learned Helplessness: *Feelings of helplessness that develop after exposure to situations in which nothing individuals do affects their outcomes. Learned helplessness appears to play a role in the occurrence of depression.*

Self-Schemas: *Cognitive frameworks that serve to organize information about the self.*

requests for reassurance can be annoying, and so tend to backfire: Ultimately, they lead to increased *rejection* by others—precisely the outcome depressed persons want to avoid (Joiner, Alfano, & Metalsky, 1993).

In addition to holding negative views about themselves, depressed persons often seem to hold negative views about others, too. This fact is illustrated very clearly by a study conducted recently by Gara and his colleagues (1993). In this investigation, both depressed and nondepressed persons were asked to describe nine people in their lives: mother, father, a significant other, three other people important to them, and three acquaintances who were less important. Then participants were asked to describe ten different aspects of their self-image: "me as I actually am," "how I am with my father," "how I am with my mother," and so on for the nine persons they described earlier. Finally, they were asked to rate themselves and each of the nine people in terms of attributes they mentioned in their descriptions.

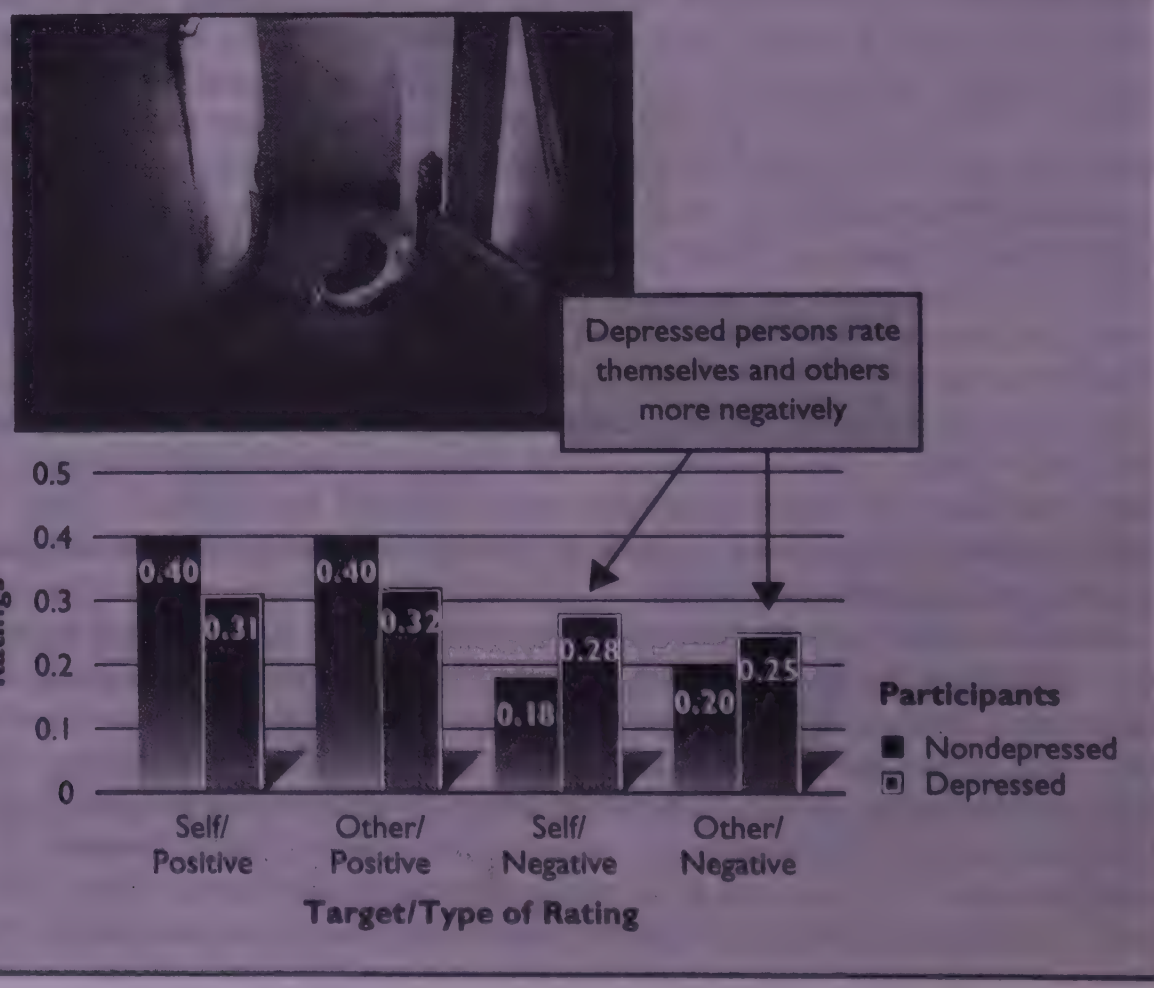
On the basis of this information, Gara and his colleagues constructed measures of the extent to which individuals described themselves and others in positive or negative terms. It was predicted that the depressed persons would describe both themselves and others more negatively than the nondepressed persons, and as you can see from Figure 14.2, this is precisely what occurred.

Finally, depressed persons are prone to several types of faulty or distorted thinking (Persad & Polivy, 1993). For example, they tend to dwell on and amplify the importance of negative events while ignoring and minimizing the importance of positive outcomes. As a result, they often show better memory for failures and other unpleasant events than for successes or other ego-boosting experiences (Kuiper, Olinger, & MacDonald, 1987). In sum, several psychological mechanisms and tendencies seem to play a key role in depression.

FIGURE 14.2

Depression: Negative Views of the Social World

Depressed persons reported more negative views of themselves and of other persons in their lives than did nondepressed persons.
(*Source:* Based on data from Gara et al., 1993.)



Suicide: When Life Becomes Unbearable

Hopelessness, despair, negative views about oneself and others—these are some of the hallmarks of depression. Given such reactions, it is not surprising that many persons suffering from this disorder seek a drastic solution to their problems—**suicide**. While not all persons who attempt or actually commit suicide are deeply depressed, a large percentage of them are (Goodstein & Calhoun, 1982). And given that depression is the most common psychological disorder, this translates into alarmingly large numbers. For example, in the United States, more than two million persons have attempted suicide—almost 1 percent of the entire population. And many persons who attempt suicide succeed in carrying it out. Suicide is the tenth or eleventh most frequent cause of death in the United States, and among young persons aged fifteen to twenty-four it actually ranks *second* in this respect, behind only accidents. More than three times as many women as men attempt suicide, but men more frequently succeed in ending their own lives. This difference stems from the fact that the two sexes use different methods. Men are more likely to use a gun or jump off a building, while women tend to use less certain methods, such as overdoses of sleeping pills or slashing their wrists. Suicide rates also vary with age and by nation. The highest suicide rates occur among older people, but suicide has been on the rise among young people for several decades and is now disturbingly high even among teenagers (see Figure 14.3).

Can suicide be predicted? While there are no hard and fast rules for determining who may choose this path or when they may make the attempt, there do appear to be several important warning signs. First, suicide often seems to occur not when individuals are in the depths of despair—most depressed—but rather when they show some improvement. Apparently, deeply depressed per-

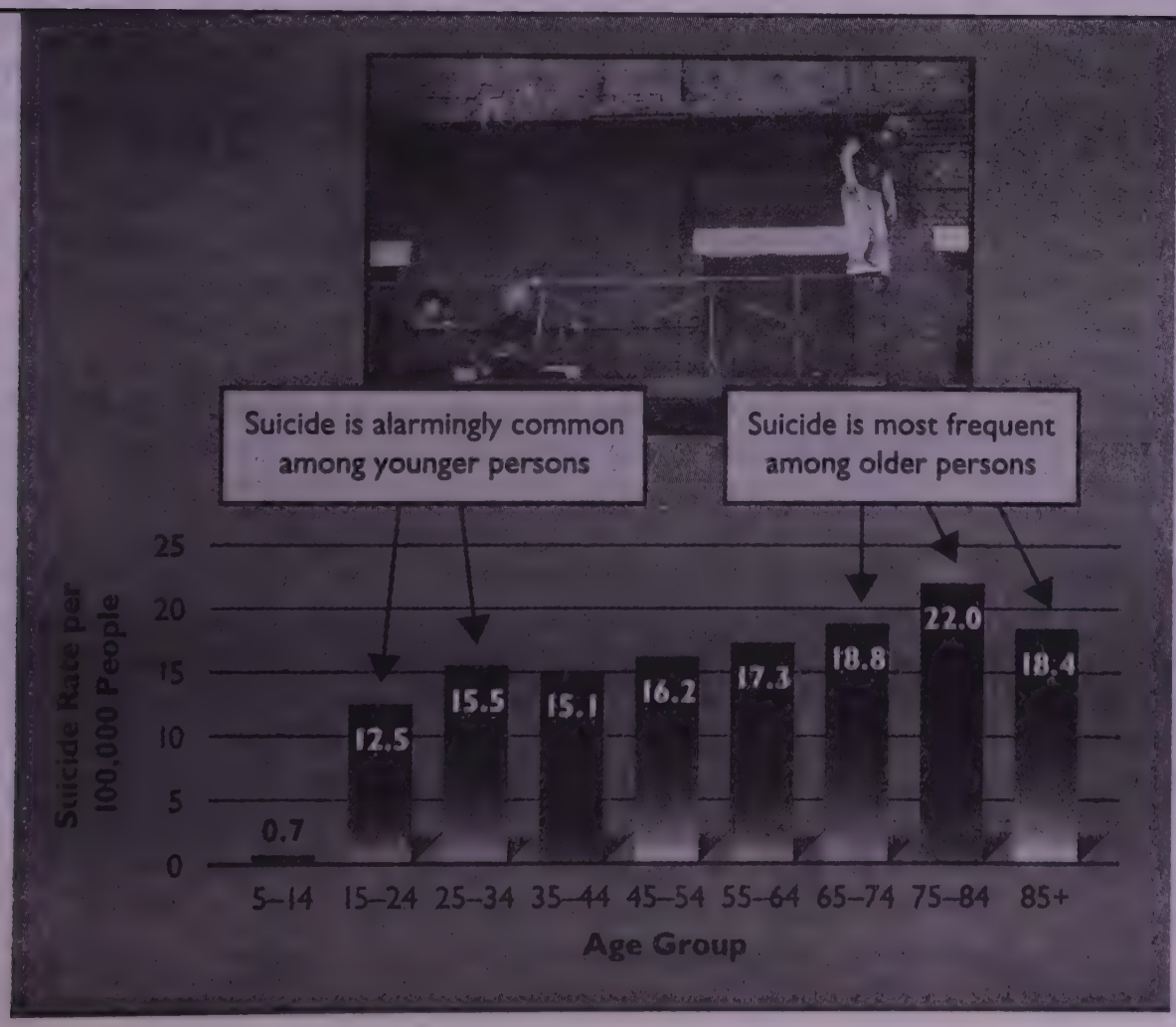


FIGURE 14.3

Suicide Rates as a Function of Age

Suicide rates are highest among older Americans. However, alarmingly large numbers of young people also take their own lives. (*Source*: U.S. Government Printing Office, 1987.)

Suicide: *The act of taking one's own life.*

sons lack the energy or will to commit suicide. When they feel somewhat better, however, they become capable of this act. Another clue to suicidal plans involves a period of calm following considerable agitation; the person may have made his or her decision and now feels calm or even relieved that an end to the suffering is in sight.

Additional, and often highly useful, clues to potential suicide are provided by cognitive factors. For example, persons who are seriously contemplating suicide report fewer and weaker reasons for living than others (Steede & Range, 1989). Perhaps even more surprising, they also report different patterns of thoughts about death and its effects. When people contemplate their own deaths, they report several distinct types of fear relating to this event: fear of loss of self-fulfillment (it will bring an end to their plans); fear of self-annihilation or of loss of social identity (they will be forgotten by others); fear of consequences to their family; and fear of the unknown. Recent findings indicate that persons who have actually attempted suicide report roughly equal fear of each of these outcomes (Orbach et al., 1993). In contrast, individuals who have not attempted suicide report contrasting levels of fear for these components: They are most frightened of loss of self-fulfillment and of the unknown, and least frightened about loss of social identity.

KEY POINTS

- Persons suffering from depression experience negative moods, reduced energy, feelings of hopelessness, a loss of interest in previously satisfying activities, difficulties in sleeping, and recurrent thoughts of death.
- Individuals with bipolar disorders, ride an emotional roller-coaster between states of mania (elation) and deep depression.
- Genetic factors seem to play a role in the occurrence of mood disorders.
- Disturbances in brain activity and biochemistry also seem to play a role in depression.
- Psychological factors are involved in the occurrence of mood disorders. These include feelings of helplessness, tendencies to attribute negative outcomes to internal causes, and negative perceptions of both oneself and others.
- Suicide is a major cause of death among young people.
- Individuals are more likely to attempt suicide when they have recovered to some extent from their depression.
- People contemplating suicide often seem to show less concern over certain aspects of death than persons who are not at high risk for suicide.
- Suicide may involve efforts by individuals to escape from a self they find inadequate and intolerable.

Causes of Suicide: Contrasting Perspectives Why, precisely, do some individuals choose to end their own lives? As noted previously, only *some* depressed persons adopt this course of action; so depression itself can be only part of the answer. Several different theories have been offered to account for suicide. Freud contended that suicide stems from the *death instinct*, an urge to return to nothingness, which he believed to be part of our basic biological heritage.

A sharply different explanation of suicide, and one more consistent with the principles and findings of modern psychology, has been offered by Baumeister (1990). He suggests that suicide is the result of efforts by individuals to escape themselves—or, more accurately, to escape from awareness of their own faults and shortcomings. A considerable amount of evidence lends support to this newer view of suicide. For example, persons who attempt or actually commit suicide have been found to have less favorable views of themselves than others. Similarly, other evidence suggests that many persons who commit suicide are indeed in a state of heightened self-awareness. For instance, the notes left by suicides mention themselves more often than the notes left by people who are facing involuntary death—through disease or executions (Hull et al., 1983). Finally, the fact that persons who have attempted suicide report roughly equal fear of all aspects of death is also consistent with this view. Baumeister suggests that in the final stages, people trying to escape from themselves enter a state in which they don't bother to invest much mental effort in thinking about the consequences of suicide. Viewing all aspects of death as equally frightening is suggestive of such a "low mental effort" pattern.

In sum, considerable evidence is consistent with the view that suicide sometimes, and to some degree, stems from efforts by individuals to escape from a self they can no longer bear. However, other factors, too, probably play a role, for

suicide is too complex—and too drastic—an action to be explained by one or even a few basic causes.

ANXIETY DISORDERS: When Dread Debilitates

At one time or another we all experience **anxiety**—increased arousal accompanied by generalized feelings of fear or apprehension. If such feelings become very intense and persist for long periods of time, however, they can produce harmful effects. Such **anxiety disorders** take several different forms.

PANIC ATTACK: The Body Signals "Danger!" But Is It Real?

Have you ever experienced *panic*—very high levels of physical arousal coupled with the intense fear of losing control? If you have, don't worry: Almost everyone has had this experience at some time or other. But persons who suffer from a psychological condition known as **panic attack disorder** experience such reactions often, and sometimes without any specific triggering event. Such attacks can involve all or several of the following symptoms: pounding heart, chest pains, nausea, dizziness, trembling or shaking, fear of losing control or going crazy, chills, hot flashes, and numbness. Consider the following case history:

> Sally experienced her first panic attack out of the blue three weeks after completing her senior year of college. She had just finished a job interview and was meeting some friends for dinner. In the restaurant, she began to feel dizzy. Within a few seconds, her heart was pounding and she was feeling breathless—as though she might pass out. Sally experienced a similar episode a week later while at a movie. . . . Her attacks became more and more frequent. Before long, she was having several attacks per week. In addition, she constantly worried about having attacks. She began to avoid exercise and other activities that produced physical sensations. She avoided driving, shopping in large stores, and eating in all restaurants. Some weeks she avoided leaving the house completely. Sally stopped looking for work, fearing that she would be unable to stay at her job in the event of a panic attack . . . (Barlow, 1992, p. 79).

For some persons, like Sally, panic attacks occur out of the blue—without any apparent cause. For others, however, they are linked with specific situations. In that case, panic disorder is associated with **agoraphobia**—intense fear of specific situations in which, individuals fear, they will experience panic attacks. Common patterns for agoraphobia include fear of being in a crowd; standing in a line; being on a bridge; traveling in a bus, train, or car; or merely leaving home (American Psychiatric Association, 1993). Persons suffering from such disorders often experience anticipatory anxiety—like Sally, they are terrified of becoming afraid! I have a good friend who suffers from one form of agoraphobia: He is totally unwilling to travel by airplane. Since he has an active career, this condition causes him great difficulties. He has to drive or take trains even to distant locations. Yet he resists all suggestions that he seek professional help. Apparently the mere thought of discussing his problem is so anxiety-provoking that he prefers to leave matters as they are, despite the inconvenience and discomfort he is experiencing.

Anxiety: *Increased arousal accompanied by generalized feelings of fear or apprehension.*

Anxiety Disorders: *Psychological disorders that center on the occurrence of anxiety and include generalized anxiety, phobias, and obsessive-compulsive disorders.*

Panic Attack Disorder: *Anxiety disorder characterized by relatively brief periods during which individuals experience unbearably intense anxiety.*

Agoraphobia: *Fear of losing control and experiencing a panic attack in specific situations, such as in open places, in a crowd, or on an airplane.*

MUNCH'S *THE SCREAM*

This famous painting seems to evoke the feelings associated with panic attack disorder.

What causes panic attacks? Existing evidence indicates that both biological factors and conditioning play a role (Barlow, 1988, 1992; Clark, 1988). For example, some persons have a tendency to view their own emotions as unpredictable and uncontrollable. As a result, when they experience panic, they also experience anxiety that the panic will be repeated. This anxiety in itself may lead to additional panic attacks. The result: a vicious circle of panic–anxiety–panic–anxiety is established. Other findings indicate that persons suffering from panic disorder process threatening information differently than do other individuals; in particular, they seem more likely to notice and remember words (e.g., "madness," "choke," "faint," etc.) or other stimuli related to panic (Becker, Rinck, & Margraf, 1994). So, cognitive factors, too, seem to play a role.

PHOBIAS: Fear That Is Focused

Most people will express some fear of snakes, heights, violent storms, and buzzing insects such as bees or wasps. Since all of these can pose real threats to our safety, such reactions are adaptive, up to a point. Some persons, though, experience intense anxiety when in the presence of these objects or even when they merely think about them. Such *phobias* can be so strong that they interfere with everyday activities. Thus, persons suffering from animal phobias may avoid visiting friends who own dogs or may cross the street to avoid passing a person walking a pet. Similarly, those with *social phobias*—fear of social situations—may avoid a wide range of situations in which they fear they will be exposed to and scrutinized by unfamiliar persons.

What accounts for such strong and irrational fears? One possibility involves the process of *classical conditioning*, described in chapter 5. Through such learning, stimuli that could not initially elicit strong emotional reactions can often come to do so. For example, consider the case of an individual who has a snake phobia. Perhaps as a child he witnessed one of his playmates actually being bitten by a snake. Although he himself experienced no harm, he reacted to the intense fear of his friend with strong arousal. The snake, a stimulus that was previously fairly neutral, now came, through classical conditioning, to evoke a similar reaction. (As you can readily see, observational learning, too, played a role in this example.) As we saw in chapter 5, classical conditioning is especially likely to occur with respect to certain stimuli: ones for which we are biologically *prepared* to acquire associations. Thus, phobias directed toward pencils, rabbits, and palm trees are virtually nonexistent, while those toward snakes and spiders are much more common.

OBSESSIVE-COMPULSIVE DISORDER: Behaviors and Thoughts outside One's Control

Have you ever left your home, gotten halfway down the street, and then returned to see if you really locked the door or turned off the stove? Most of us have had such experiences, and they are completely normal. But for some persons, such anxieties are so intense that the individuals become trapped in repetitious behaviors known as *compulsions* that they seem unable to prevent, or in recurrent modes of thought called *obsessions*. Consider the following description of a person suffering from an **obsessive-compulsive disorder** of this kind:

Obsessive-Compulsive Disorder: *Anxiety disorder in which an individual is unable to stop thinking the same thoughts or performing the same ritualistic behaviors.*

> When George wakes in the morning . . . he feels that his hands are contaminated so he cannot touch his clothing. He won't wash in the bath-

An Example of Compulsive Behavior

Like Ernie, persons suffering from compulsions cannot stop themselves from engaging in certain behaviors.
(*Source:* FRANK & ERNEST reprinted by permission of NEA, Inc.)

room because he feels that the carpet is contaminated. . . . I have to dress him, having first cleaned his shoes and got out a clean shirt, underclothes, socks and trousers. He holds his hands above his head . . . to make sure that he doesn't contaminate the outside of his clothing. Any error or mishap and he will have to have clean clothes. . . . George then goes downstairs, washes his hands in the kitchen and thereafter spends about twenty minutes in the toilet. . . . Basically he has to be completely sure that there is no contamination around because if he is not then he will start to worry about it later on . . . (Rachman & Hodgson, 1980, pp. 66–67).

What is the cause of such reactions? We all have repetitious thoughts occasionally. For example, after watching a film containing disturbing scenes of violence, we may find ourselves thinking about these over and over again. Most of us soon manage to distract ourselves from such unpleasant thoughts. But individuals who develop an obsessive-compulsive disorder are unable to do so. They are made anxious by their obsessional thoughts, yet they can't dismiss them readily from their minds. As a result, they become even more anxious, and the cycle builds. Only by performing specific actions can they ensure their "safety" and reduce this anxiety. Therefore, they engage in complex repetitive rituals that can gradually grow to fill most of their day. Since these rituals do generate reductions in anxiety, the tendency to perform them grows stronger. Thus, unless they receive effective outside help, persons suffering from obsessive-compulsive disorders have little chance of escaping from their anxiety-ridden prisons.

Posttraumatic Stress Disorder

Imagine what it is like to be sleeping in your own bed and then suddenly to be thrown out onto the floor as the ground under your home heaves and shakes. Once awakened, you find yourself surrounded by the sounds of objects, walls, and even entire buildings crashing to the ground—accompanied by shrieks of fear and cries of pain from your neighbors or perhaps even your own family. This is precisely the kind of experience reported by many persons during the California earthquake of 1994.

Natural Disasters: One Cause of Posttraumatic Stress Disorder

When individuals live through natural disasters, such as the 1994 California earthquake, they sometimes develop posttraumatic stress disorder.

Such experiences are described as *traumatic* by psychologists because they are extraordinary in nature—and extraordinarily disturbing. It is not surprising, then, that some persons exposed to them experience *posttraumatic stress disorder*—a disorder, as described in chapter 13, in which people persistently reexperience the traumatic event in their thoughts or dreams, persistently avoid stimuli linked with the trauma (places, people, thoughts), and persis-

tently experience symptoms of increased arousal such as difficulty falling asleep, irritability, or difficulty in concentrating. Posttraumatic stress disorder can stem from a wide range of traumatic events—natural disasters, accidents, rape and other assaults, or the horrors of wartime combat (Pitman et al., 1990). For example, survivors of the Khmer Rouge atrocities in Cambodia during the 1970s and 1980s witnessed such events as the murder of their families, men crushing infants by swinging them against trees, and many forms of torture. The result: many developed the symptoms of posttraumatic stress disorder and are still suffering from it many years later (Wilkinson, 1994). To compound their suffering, many persons who have survived atrocities or natural disasters also experience intense guilt; the fact they have survived while those they loved have died weighs heavily on their conscience. Clearly, then, posttraumatic stress disorder is a painful condition.

Anxiety: The Role of Subliminal Processing

For persons suffering from anxiety disorders, the world is often a threatening place. They perceive danger everywhere, in contexts and actions that most people view as quite harmless. Why? What accounts for this distorted view of the physical and social environment? One answer seems to involve a tendency on the part of anxious persons to direct a larger-than-usual portion of their information-processing capacity to anxiety-relevant information. In other words, they "see" danger everywhere because, in a sense, they actively search for it (Mathews, 1990). Many studies offer support for this view, indicating that persons suffering from anxiety disorders are indeed more likely to notice and process information relating to their anxieties (Martin, Williams, & Clark, 1991). And at least one recent investigation, conducted by Mogg and her colleagues (Mogg et al., 1993), suggests that anxious persons are more sensitive than other persons to stimuli relevant to their anxiety even *before* such information has entered conscious awareness, even when it is presented *subliminally*.

To test this possibility, Mogg and her coworkers asked three groups of participants—anxious persons, depressed persons, and normal controls—to perform a color-naming task. Briefly, they asked the participants to name the colors of patches on which words appeared while ignoring the words themselves. In one condition (*subliminal*), the words were shown so briefly that they could not be recognized; indeed, exposure was so brief (14 milliseconds) that participants could not even tell whether a word had been presented. In another (*supraliminal*) condition, in contrast, the words were shown until participants named the color of the background. Some of the words shown were related to anxiety (such as embarrassed," "candor"), while others were related to depression (such as "misery," "discouraged"). The others were either neutral ("carpet," "domestic") or positive ("adorable," "bliss").

Mogg and her associates reasoned that if anxious persons automatically devote more of their information-processing capacity to anxiety-related words, then anxious participants would respond more slowly than the depressed or control participants on trials when these words were presented. In contrast, neither depressed nor controls would show such effects. This is precisely what happened (see Figure 14.4).

Key Points

- Anxiety disorders involve increased arousal accompanied by generalized feelings of fear or apprehension.
- Panic attacks involve symptoms of arousal coupled with intense fear—often of losing control in some specific situation. Both biological factors and several kinds of learning seem to play a role in their occurrence.
- Phobias are excessive fears focused on specific objects or situations. Obsessive-compulsive disorder involves repetitious thoughts or actions individuals seem powerless to prevent.
- Persons suffering from anxiety disorders seem to direct more of their information-processing capacity than others to anxiety-related stimuli.

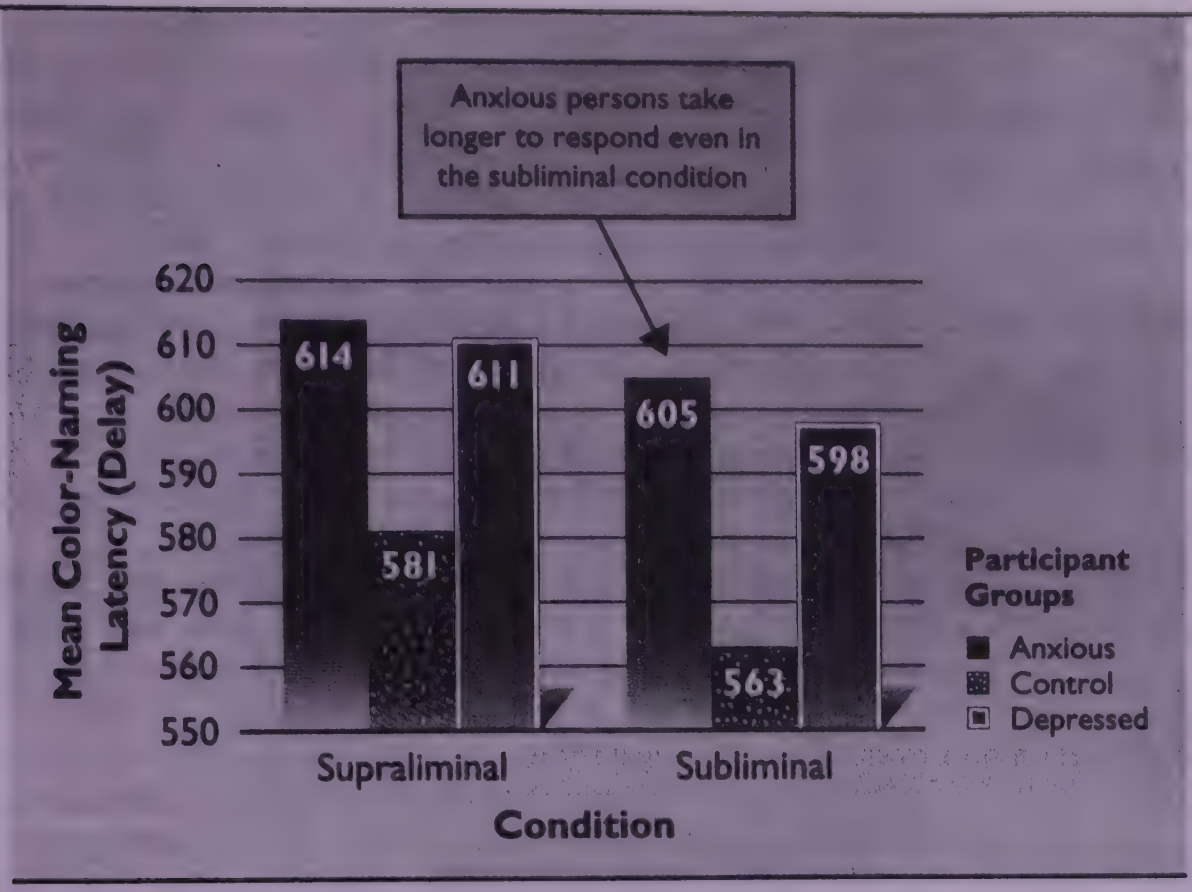


FIGURE 14.4

Subliminal Processing and Anxiety

Persons suffering from anxiety disorders responded more slowly on a color-naming task when exposed to anxiety-related words. Moreover, this was true even when these words were presented so briefly that the participants could not tell whether words were present. These findings suggest that anxious persons direct more of their information-processing resources toward threatening information than other persons. Moreover, they seem to do so in a rapid, automatic manner. (*Source:* Based on data from Mogg et al., 1993.)

Anxious persons responded more slowly to both kinds of negative words—both anxiety-related and depression-related—than the other two groups. Moreover, this was true in both the subliminal and supraliminal condition.

These findings, and those of related studies (e.g., Williams et al., 1988) indicate that persons suffering from anxiety disorder do indeed direct more of their information-processing resources toward threatening information than other persons, even before such information enters conscious awareness. To the extent this is true, it may be difficult to eliminate anxiety through forms of therapy focused on conscious thoughts and reactions. Rather, this underlying tendency to notice threatening information must be overcome, too.

SOMATOFORM DISORDERS: Physical Symptoms without Physical Causes

Somatoform Disorders: *Category of disorders in which psychological conflicts or other problems take on a physical form.*

Somatization Disorder: *A psychological condition in which individuals report physical complaints and symptoms, including aches and pains, problems with their digestive systems, and sexual problems such as sexual indifference or irregular menstruation.*

Several of Freud's early cases, ones which played an important role in his developing theory of personality, involved the following puzzling situation. An individual would show some physical symptom (such as deafness, or paralysis of some part of the body); yet careful examination would reveal no underlying physical causes for the problem. Such disorders are known as **somatoform disorders**—disorders in which psychological conflicts or other problems take on a *somatic*, or physical, form. The DSM-IV recognizes several distinct somatoform disorders.

One of these is known as **somatization disorder**, a condition in which individuals report physical complaints and symptoms that may include aches and pains, problems with their digestive systems, and sexual problems (such

as sexual indifference or irregular menstruation). Another is **hypochondriasis**—preoccupation with fears of disease. Such persons do not actually have the diseases they fear, but they persist in worrying about them despite repeated reassurance by their doctors that they are healthy. It is important to note that hypochondriacs are not simply faking; they feel the pain and discomfort they report and are truly afraid that they are about to fall ill.

Another somatoform disorder is known as **conversion disorder**. In hypochondria, there are no apparent physical disabilities—just the feeling that they will develop. In conversion disorders, however, there are actual impairments. Individuals suffering from such disorders may experience blindness, deafness, paralysis, or loss of sensation in various body parts. Yet while these disabilities are quite real to the persons experiencing them, there is no underlying medical condition that would produce them.

What is the origin of somatoform disorders? Freud suggested that persons experiencing unacceptable impulses or conflicts converted these into various symptoms. By doing so, they reduced the anxiety generated by the impulses, and at the same time gained much sympathy and attention. A behavioral interpretation of these disorders, in contrast, emphasizes the rewards individuals often obtain by adopting the *sick person role*. Being ill elicits sympathy and caring from others, and for some persons these benefits seem to have an irresistible charm. A third interpretation emphasizes cognitive factors, suggesting that individuals who experience somatoform disorders have a tendency to focus excessively on normal bodily sensations and to misinterpret them, attributing them to various serious conditions (Barsky & Wyshak, 1989). Thus, for example, when such persons experience increased heart rate, they interpret this as "I'm having a heart attack" rather than as "I'm excited or nervous," the kind of interpretation most people would adopt. Whatever their origins, somatoform disorders appear to be quite common. It has been estimated that as much as 20 percent of all patients admitted to hospitals may be suffering from symptoms produced by somatoform conditions (Jones, 1980).

KEY POINTS

- Somatoform disorders are disorders in which psychological conflicts are reflected in physical symptoms. Examples include somatization disorder, hypochondriasis, and conversion disorder.
- Somatoform disorders may be explained by the benefits conferred by the sick person role, as well as by tendencies to attribute normal body sensations to serious causes.

DISSOCIATIVE DISORDERS: When Memory Fails

Hypochondriasis: A psychological disorder in which individuals convert anxiety into chronic preoccupations with their health and bodily functions.

Conversion Disorder: Psychological disorder in which individuals experience real motor or sensory symptoms for which there is no known organic cause.

Have you ever awakened during the night and, just for a moment, been uncertain about where you were? Such temporary disruptions in our normal cognitive functioning are far from rare; many persons experience them from time to time as a result of fatigue, illness, or the use of alcohol or other drugs. Some individuals, however, undergo much more profound and lengthy losses of identity or memory. These are known as **dissociative disorders** and, like several other psychological disorders, can take several different forms.

In chapter 6, we saw that *amnesia*—loss of memory—can sometimes be produced by illnesses or injuries to the brain. Sometimes, however, amnesia seems to occur in the absence of any clear-cut physical cause. This **dissociative amnesia** appears to stem from the active motivation to forget. After experiencing some traumatic event, violating their own standards, or undergoing intense stress, individuals sometimes go blank with respect to these events and cannot recall them. Such amnesia can involve all events within a

particular period of time (*localized amnesia*) or only some events occurring during this period (*selective amnesia*). Alternatively, it can erase memories for a person's entire life prior to a specific date (*generalized amnesia*). While individuals suffering from such disorders truly cannot remember past events, many aspects of their behavior remain intact: habits, tastes, previously learned skills. Musicians can continue to play their instruments, computer programmers can still operate computers, and beauticians can still give permanents; they may not remember that they once earned a living through such activities, however.

A second type of dissociative disorder is known as **dissociative fugue**. This is a sudden and extreme disturbance of memory in which individuals wander off, adopt a new identity, and are unable to recall their own past. Newspapers often report accounts of individuals who simply vanish one day, only to reappear years later in a new location living a new life—often with a new spouse and family.

Such reactions can truly be described as *dissociative* in nature, for they seem to represent disorders in which some portion of memory is split off, or dissociated, from conscious awareness. Please see the **Point of It All** section below for discussion of another form of dissociative disorder.

KEY POINTS

- Dissociative disorders involve profound losses of memory or personal identity.
- Individuals with dissociative amnesia, are unable to remember various events, especially ones they found traumatic.
- In dissociative identity (multiple personality) disorder, individuals seem to possess several distinct personalities, which alternate in controlling their behavior.

THE POINT OF IT ALL

Dissociative Identity Disorder: Multiple Personalities in a Single Body?

Perhaps the most dramatic form of dissociative disorder is **dissociative identity disorder**, a condition labeled *multiple personality disorder* in earlier versions of the DSM. In this rare disorder, a single person seems to possess two, three, or even many distinct personalities. Some of these personalities are dominant, and alternately take control of the person's behavior. In addition, persons suffering from this type of dissociative disorder report selective amnesia: Information retained by one personality is not necessarily available to the others.

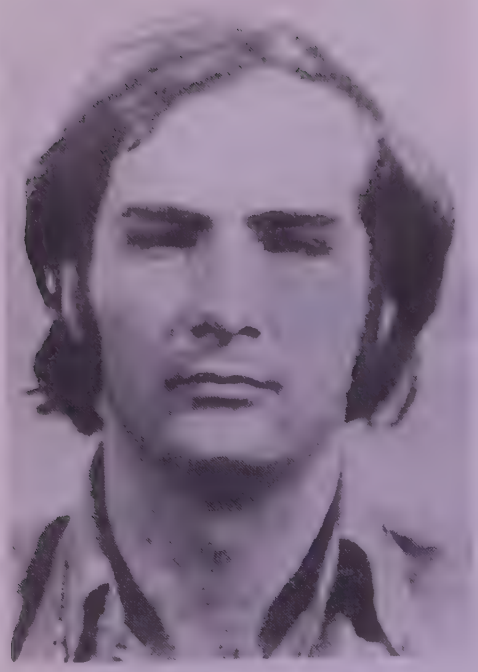
A dramatic illustration of dissociative identity disorder is provided by the case of William Milligan, a man arrested in 1977 for the rapes of three women. Milligan was identified by two of the victims, and his fingerprints matched those at the scene of one of the crimes, so it appeared to be an open-and-shut case. Only when he twice attempted suicide was he examined by psychiatrists. The results of their examinations were remarkable, to say the least. Milligan appeared to possess not one or two distinct personalities but at least *ten*. One was "Billy" Arthur, an emotionless Englishman who dominated the others. A second was Ragen, a powerful Yugoslavian. Additional personalities included Tommy, a belligerent teenager; Christene, a three-year-old English girl; and Christopher, her disturbed thirteen-year-old brother. On the basis of psychiatric testimony concerning his disorder, Milligan was found not guilty by reason of insanity—a legal category suggesting that he was not responsible for his actions. Thus, he was sent for treatment to a mental health center, where it was discovered that he had still more personalities, including a thug with a Brooklyn accent, a practical joker, and, surprisingly, a social snob! Milligan underwent treatment in a state facility for several years and was released

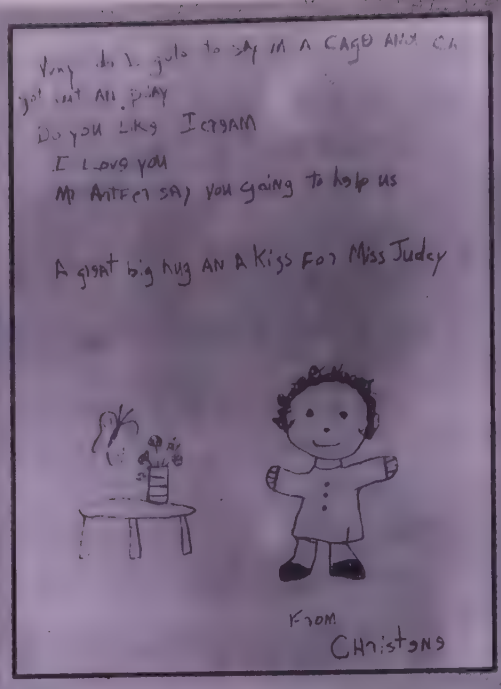
Dissociative Disorder: *Psychological disorder in which individuals experience profound and lengthy losses of identity or memory.*

Dissociative Amnesia: *Amnesia for which there is no organic cause.*

Dissociative Fugue: *Form of dissociative amnesia in which individuals forget their identity and virtually all of their past life.*

Dissociative Identity Disorder: *Multiple personality disorder, in which a single individual seems to possess more than one personality.*





MULTIPLE PERSONALITY: REAL OR FRAUD?

William Milligan, a convicted rapist, appeared to possess more than ten distinct personalities, including the one whose writing appears here. Although many cases of multiple personality (now termed *dissociative identity disorder*) are faked, others do appear to represent genuine psychological disorders.

when his separate personalities appeared to fuse. After his release he worked for a child-abuse prevention agency and later developed a career as an artist (Kihlstrom, Tataryn, & Hoyt, 1993).

Another bizarre case of dissociative identity disorder came to light some years ago when a multiple-personality patient accused a man she had dated, Mark Peterson, of rape. She claimed that only one of her personalities had given consent. Another had watched the event, and still another went to the police to report the assault. Peterson was convicted under a law that makes having sexual intercourse with a mental patient equivalent to rape (Kihlstrom et al., 1993).

These and other striking cases of dissociative identity disorder raise an intriguing question: Is multiple personality genuine—a real form of psychological disorder? Or are persons like William Milligan merely clever fakers? No final answer to this question currently exists. Some evidence, however, suggests that there is more to multiple personality than simple faking: Persons showing this disorder sometimes demonstrate distinctive patterns of brain activity when each of their supposedly separate personalities appear (Kaplan & Sadock, 1991). Similarly, each personality often scores differently on standardized personality tests (Kaplan & Sadock, 1991). Even the need for eyeglasses, or being right- or left-handed, may vary among different personalities.

Interestingly, dissociative identity disorder is nine times more common in women than men (Putnam, 1991; Putnam et al., 1986). Its causes have not yet been clearly identified, but many persons suffering from this disorder report that they experienced traumatic events, such as physical or sexual abuse, early in life (Ross et al., 1990). This has led to the suggestion that perhaps such persons use multiple personalities as a means of distancing themselves from the painful realities of their early lives. Unfortunately, it is often very difficult to determine whether reports of early sexual or physical abuse are accurate: many years have passed since these events supposedly took place (Kihlstrom et al., 1993). And, as noted in our discussion of *repressed memories* in chapter 6, the seeds for some reports of such experiences may actually be planted by unwary therapists who mention this possibility to their patients (Loftus, 1993). For this reason, this interpretation of the origins of multiple personality must be viewed mainly as an intriguing but as yet unverified possibility. Whatever its specific origins, however, one fact is clear: Dissociative identity disorder is one of the most bizarre forms of psychological disorder studied—and treated—by psychologists.

SEXUAL AND GENDER IDENTITY DISORDERS

As we saw in chapter 12, Freud believed that many psychological disorders can be traced to disturbances in *psychosexual development*—our progression through a series of stages in which our quest for pleasure is centered on dif-

ferent parts of the body and different activities. While this theory is not currently accepted by most psychologists, there is little doubt that problems relating to sexuality and gender identity constitute an important group of psychological disorders. Several of these are considered below.

Sexual Dysfunctions: Disturbances in Desire and Arousal

Sexual dysfunctions include disturbances in sexual desire, sexual arousal, and/or the ability to attain orgasm. Such problems are classified according to when, in the normal pattern of sexual activity discussed in chapter 10, they occur. **Sexual desire disorders** involve a lack of interest in sex or active aversion to sexual activities. Persons suffering from these disorders report that they rarely have the sexual fantasies most persons generate, that they avoid all or almost all sexual activity, and that these reactions cause them considerable distress.

In contrast, **sexual arousal disorders** involve the inability to attain or maintain an erection (males) or the absence of vaginal swelling and lubrication (females). *Orgasm disorders* involve the delay or absence of orgasm in both sexes, and may also include *premature ejaculation* (reaching orgasm too quickly) in males.

Paraphilias: Disturbances in Sexual Object or Behavior

What is sexually arousing? For most people, the answer has to do with the sight or touch of another human being—one they find sexually attractive. But human beings may also be aroused by other stimuli, too. Many men report that they find certain types of women's lingerie arousing. Similarly, members of both sexes are sometime aroused by specific aromas—perfumes or other scents they associate with past enjoyable sexual experiences (Levine & McBurney, 1982). Still others find that either inflicting or receiving some slight pain increases their arousal and sexual pleasure. Do such reactions constitute sexual disorders? According to most psychologists they do not. Such disorders are indicated only when unusual or bizarre imagery or acts are *necessary* for sexual arousal. In other words, **paraphilias** (from the Greek *para,* meaning "amiss,"and *philia,* meaning "love") may be said to exist only when unusual images, acts, or objects are required for sexual arousal and fulfillment.

Several types of paraphilias exist. In *fetishes,* individuals become aroused exclusively by inanimate objects. Often these are articles of clothing, such as shoes or underwear; in more unusual cases they can involve human waste, dirt, animals, or even dead bodies. *Frotteurism,* another paraphilia, involves fantasies and urges focused on touching or rubbing against a nonconsenting person. The touching, not the coercive nature of the act, is what persons with this disorder find sexually arousing. Perhaps more disturbing is *pedophilia,* in which individuals experience sexual urges and fantasies involving sexual activity with children, generally ones younger than thirteen. When such urges are translated into overt activity, the effects on the young victims can, of course, be devastating. Two other paraphilias are *sexual sadism* and *sexual masochism.* In the former, individuals become sexually aroused by inflicting pain or humiliation on others. In the latter, they are aroused by receiving such treatment. Looking back, I now realize that one of my friends in college probably suffered from a mild form of sexual sadism; he frequently stated that hurting his girlfriends in some manner turned him on. It's interesting to note that he never lacked for willing partners, even in the (supposedly) repressed early 1960s. See Table 14.2 (on page 568) for other paraphilias.

Sexual Desire Disorders: *Psychological disorders involving a lack of interest in sex or active aversion to sexual activities.*

Sexual Arousal Disorders: *Psychological disorders involving inability to attain an erection (males) or absence of vaginal swelling and lubrication (females).*

Paraphilias: *Sexual disorders involving choices of inappropriate sexual objects, such as young children, or the inability to experience arousal except in the presence of specific objects or fantasies.*

TABLE 14.2

Paraphilias

Paraphilias—disorders in which unusual or bizarre imagery or acts are necessary for sexual arousal—take many different forms. A few are listed here.

PARAPHILIA	DESCRIPTION/SYMPTOMS
Exhibitionism	Sexual urges or arousing fantasies involving exposure of one's genitals to an unsuspecting stranger
Voyeurism	Recurrent sexual urges or arousing fantasies involving the act of observing an unsuspecting person who is naked, disrobing, or engaging in sexual activity
Transvestic fetishism	Intense sexual urges and arousing fantasies involving cross-dressing (dressing in the clothing of the other sex)
Other paraphilias	Telephone scatologia (lewdness) Necrophilia (sexual arousal to corpses) Zoophilia (sexual contact with or fantasies concerning animals)

GENDER IDENTITY DISORDERS

Have you ever read about a man who altered his gender to become a woman, or vice versa? Such individuals feel, often from an early age, that they were born with the wrong sexual identity. They are often displeased with their own bodies and request—again, often from an early age—that they receive medical treatment to alter their primary and secondary sex characteristics. In the past there was little that medicine could do to satisfy these desires on the part of persons suffering from *gender identity disorder*. However, advances in surgical techniques have now made it possible for such persons to undergo *sex-change operations*, in which their sexual organs are actually altered to approximate those of the other sex. Before their operations these individuals receive extended counseling, learning the mannerisms of the other gender, how to wear its clothes, and so on; then the actual operations are performed. Several thousand individuals have undergone such operations, and existing evidence indicates that most report being satisfied with the results and happier than they were before (Green & Fleming, 1990). However, follow-up studies suggest that some persons who undergo such operations experience regrets and continued unhappiness, sometimes to the point that they commit suicide or experience serious psychological disorders (Abramowitz, 1986). So it appears that such operations have a serious potential "downside" that should be carefully considered.

KEY POINTS

- Sexual disorders involve disturbances in sexual desire, sexual arousal, or the ability to attain orgasm. Paraphilias are disturbances in which unusual imagery or acts are necessary for sexual arousal.
- Persons suffering from gender identity disorder feel that they were born with the wrong sexual identity and seek to change this identity through medical treatment or other means.

EATING DISORDERS

***Eating Disorders:** Serious disturbances in eating habits or patterns that pose a threat to individuals' physical health and well-being.*

In our discussion of motivation (chapter 10), we encountered two serious **eating disorders**: *anorexia nervosa* and *bulimia nervosa*. These disorders are very common at the present time and adversely affect the health and well-being of millions of young persons. Thus, it seems important to return to these disorders here and to expand somewhat on the earlier discussion.

As you will recall, anorexia nervosa is a disorder in which individuals, intensely fearful of being or becoming "fat," literally starve themselves, failing to maintain a normal body weight. In contrast, bulimia nervosa involves episodes of binge eating followed by various forms of compensatory behavior designed to avoid weight gain—such as self-induced vomiting or overuse of laxatives. As I noted in chapter 10, both of these eating disorders are much more common among females than among males (Hinsz & Williamson, 1987). Both disorders seem to stem at least in part from dissatisfaction with personal appearance and efforts to match the thin-is-in model promoted strongly in the mass media (Thompson, 1992; Williamson, Cubic, & Gleaves, 1993).

While both of these disorders are disturbing, bulimia nervosa is perhaps, the more puzzling of the two. Typical bulimics report purging about twelve times per week. How can persons with this disorder stand the repeated binge-purge cycles that they adopt as a basic aspect of their daily lives? One possibility is that as a result of their repeated purging, bulimics experience reduced taste sensitivity (Ramirez & Bartoshuk, 1987). This, in turn, makes vomiting less unpleasant, or at least more bearable. In fact, research by Rodin and her colleagues (1990) supports this reasoning: Persons suffering from bulimia nervosa do indeed show reduced taste sensitivity relative to other persons.

The research on bulimia nervosa, then, suggests that it is even more complex than was at first assumed. Social pressures to be slim may indeed contribute to its initiation, but once it is established, shifts in the sense of taste may strengthen its occurrence and permit it to continue. One implication of these findings seems clear: Effective treatment for bulimia nervosa must include attention to sensory factors as well as to strong cultural pressures to be, and remain, slim.

ANOREXIA NERVOSA

People who suffer from anorexia nervosa often starve themselves to the point where their health is seriously endangered. What societal factors play a role in this disorder?

KEY POINTS

- Eating disorders include anorexia nervosa and bulimia nervosa.
- Both anorexia nervosa and bulimia nervosa stem in part from dissatisfaction with one's appearance. In addition, bulimia nervosa involves actual reductions in taste sensitivity that make it easier for bulimics to continue their binge-purge cycles.

PERSONALITY DISORDERS: Traits That Prove Costly

Have you ever known someone who was highly suspicious and mistrustful of others in virtually all situations? Someone who had no close friends and was a true loner in all respects? Someone who showed a strong need to be taken care of by others, coupled with a dependent, clinging approach to relationships? If so, you may have already met people with **personality disorders**. Such persons possess specific personality traits (recall our discussion of traits in chapter 12) that are inflexible and maladaptive and cause them major difficulties in many respects. Personality disorders, in other words, are long-standing habits of thought and behavior that color an individual's whole life and also impair it, by making the person unhappy, interfering with his/her functioning, or both. More formally, personality disorders can be defined as extreme personality variation associated with the failure to achieve the universal tasks of establishing a personal identity, forming attachments to others, experiencing intimacy with them, and seeking affiliation (Livesley et al., 1994). Many such disorders exist; but since the DSM-IV combines these into several major categories, we'll follow this pattern here.

Personality Disorders: *Extreme personality variation associated with the failure to achieve the universal tasks of establishing a personal identity, forming attachments to others, experiencing intimacy with them, and seeking affiliation.*

Paranoid and Schizoid Personality Disorders: Cut Off from Human Contact

From time to time, we all feel as though others are out to get us and that they can't be trusted. For persons suffering from **paranoid personality disorder**, however, such feelings are pervasive. They suspect that virtually everyone around them is trying to deceive or take advantage of them in some way. Consistent with this tendency, they perceive hidden, threatening meanings in ordinary remarks and bear strong grudges for these imaginary slights or injuries. I once had a very frightening experience with such a person. He was a coworker at one of the summer jobs I had in college, and he was convinced that everyone in the office was out to get him. For some reason he singled me out as the source of all these imaginary plots, and he threatened me with dire consequences. "Don't worry," he muttered through gritted teeth, "You'll get *yours!*" I think he meant what he said, because one evening he followed me home from work, clenched fists at his side. He didn't do anything that night, but I was relieved when, a couple of days later, he was arrested for assaulting a neighbor—another person he was convinced was engaged in deadly plots against him.

A related pattern is shown by persons suffering from **schizoid personality disorder**. They are truly detached from the social world, showing little interest in friendships, love affairs, or any other kind of intimate contact with other persons. They are indifferent to praise and criticism and often show emotional coldness and detachment. In short, contact with other persons is of little interest to them, and they often tend to perceive the people around them as mere nuisances, obstacles to the goals they wish to reach—without others' help, of course!

The Antisocial Personality Disorder

The personality disorder that has received by far the most attention is one known as the **antisocial personality disorder**. Individuals with this disorder show an almost total disregard for the rights and well-being of others. In addition, they demonstrate several characteristics that make them dangerous to others. Rules and regulations are not for them, so they often have a history of antisocial behavior: delinquency, theft, vandalism, lying, drug abuse, and the like. They are often irritable and aggressive, highly impulsive, seemingly fearless in the face of danger, and highly deceitful—they will lie to anyone, anytime, if they perceive this as advantageous. And after performing actions that harm others, they typically show no remorse.

The impulsiveness shown by such persons, coupled with several of their other traits, often lends a random, seemingly purposeless character to their antisocial behavior. Thus, the crimes committed by people with this disorder often seem to lack any rational purpose or goal. For example, consider the following chilling statement by Gary Gilmore, a convicted multiple murderer:

> I pulled up near a gas station I told the service station guy to give me all his money. I then took him to the bathroom and told him to kneel down and then I shot him in the head twice. The guy didn't give me any trouble but I just felt like I had to do it.

Why did Gilmore kill this innocent victim? He had no idea—and he didn't care. Because of their almost total lack of feelings of responsibility, individuals showing the antisocial personality disorder engage unhesitatingly in actions other persons only daydream about: They walk off jobs if they get bored, readily desert spouses and children, and simply disappear when debts

Paranoid Personality Disorder: *A personality disorder in which individuals feel that others are out to get them and cannot be trusted.*

Schizoid Personality Disorder: *A personality disorder in which individuals become almost totally detached from the social world.*

Antisocial Personality Disorder: *A personality disorder involving a lack of conscience and sense of responsibility, impulsive behavior, irritability, and aggressiveness.*

mount. For such persons, the term *obligation* has little if any meaning. Little wonder, then, they often become petty thieves, confidence artists, pimps, drug pushers, and prostitutes.

What are the origins of this pattern? What factors lead some individuals to develop this disturbing collection of traits? This is a complex issue, and existing evidence suggests that many factors probably play a role. From a behavioral perspective, such persons may learn as children, through exposure to violent models, that impulsive, aggressive behavior is appropriate: After all, the adults and older children they see around them regularly engage in such actions. As noted in our discussion of aggression (see chapter 10), such **modeling** influences can exert powerful effects on behavior (Bandura, 1986).

Cognitive factors, too, may play a role. Persons showing the antisocial personality disorder may fail to acquire the kinds of *schemas*, or cognitive frameworks, that help other persons to regulate their own behavior—schemas relating to impulse control, a sense of responsibility, and the reciprocal nature of human relationships.

Perhaps the most intriguing possibility, however, is that the antisocial personality disorder derives at least in part from physiological abnormalities. Please see the **Research Process** section on pages 572–573 for a discussion of evidence relating to this suggestion. And see Table 14.3 for a description of several other personality disorders.

KEY POINTS

- Personality disorders involve traits that are inflexible and maladaptive and cause the persons who suffer them serious difficulties. The paranoid personality disorder involves pervasive mistrust of others. The schizoid personality disorder involves a pattern of total isolation from others.
- Persons with the antisocial personality disorder show total disregard for the rights of others, coupled with reckless behavior, fearlessness, and inability to form close relationships with others. This disorder may stem both from early learning experiences and from biological factors such as reduced emotional reactions to threatening stimuli.

TABLE 14.3

Personality Disorders

As shown here, *personality disorders* take a wide range of forms.

PERSONALITY DISORDER	DESCRIPTION
Borderline personality disorder	Instability in interpersonal relationships, self-image, and moods. Relationships often alternate between idealization and devaluation of others.
Histrionic personality disorder	Excessive emotionality and attention seeking, beginning in early adulthood. Discomfort when not center of attention; inappropriate seductive or provocative behavior; exaggerated expression of emotion.
Narcissistic personality disorder	Grandiosity in fantasy and behavior, coupled with need for admiration and lack of empathy. A grandiose sense of self-importance and preoccupation with fantasies of unlimited success, brilliance, or beauty.
Avoidant personality disorder	Social inhibition, feelings of inadequacy, and hypersensitivity to negative evaluation. Unwillingness to get involved with people in new interpersonal situations.
Dependent personality disorder	Excessive need to be taken care of, leading to submissive and clinging behavior and fears of separation. Difficulty expressing disagreement with others; feeling of discomfort and helplessness when alone.

Modeling: *A basic learning process in which individuals acquire new behaviors by observing others and then put these into action.*

Antisocial Personality Disorder: The Potential Role of Biological Factors

Guiltless and *fearless* are two terms often used to describe persons showing the antisocial personality disorder. People with this condition willingly engage in dangerous, reckless forms of behavior that most persons avoid, and show little if any fear in these situations. Cool, unemotional detachment is a central hallmark of their behavior. This combination of traits has led some researchers to wonder whether persons suffering from this disorder differ from the rest of us with respect to the functioning of their nervous system, and growing evidence suggests that they do.

First, EEGs reveal that a substantial portion of such persons (as much as 40 to 50 percent) show abnormalities in brain-wave activity (Ellington, 1954). Specifically, they show increased slow-wave activity, which is typical of infants and young children but not of adults. These findings suggest that the brains of persons with the antisocial personality disorder may be immature in certain respects. If this is the case, then we would expect their antisocial behavior to decrease with age as, presumably, their brains finally catch up. In fact, this does tend to happen (Robins, 1966).

But how does such immaturity affect antisocial behavior? Growing evidence indicates that the link may be through the emotional experience of fear. Persons suffering from the antisocial personality disorder do indeed appear to be fearless, not only in everyday life, but also in controlled laboratory tests. For example, in one early study on this issue, Lykken (1957) asked three groups of participants—college students, prisoners with the antisocial personality disorder, and prisoners without it—to perform a problem-solving task. The participants indicated their answers on each problem by pushing levers on a board. For each problem there were three wrong answers; one of these led to a mild electric shock, while the other two responses simply turned on a red light. All three groups performed at a similar level, but the antisocial prisoners were less effective than the other two groups in avoiding errors that produced electric shocks. This finding suggests that whether they received an electric shock or a red light was of little concern to the antisocial prisoners. Other findings point to similar conclusions: In several studies, persons with the antisocial personality disorder show poorer performance than normal controls in learning to inhibit punished responses (e.g., Newman, Widom, & Nathan, 1985).

The Antisocial Personality Disorder and Emotional Experiences

Individuals with the antisocial personality disorder are not merely reckless and fearless: They can be described as loveless as well. They have little if any feeling or empathy for others, and they seem incapable of forming the strong emotional ties that most of us know as love. Do these patterns of behavior, too, stem from deficits in the functioning of their nervous system? Are individuals with this disorder really less capable of experiencing various emotions than other persons are? Research indicates that this may be so (Ogloff & Wong, 1990).

Perhaps the clearest evidence pointing to this conclusion is that provided by Patrick, Bradley, and Lang (1993). These researchers asked three groups of prisoners—ones clearly suffering from the antisocial personality disorder, ones showing some aspects of this disorder, and ones not showing the disorder—to view a series of slides. These slides were categorized as pleasant (opposite-sex nudes, food), unpleasant (aimed guns, snakes), or neutral (household objects, neutral faces) in content. As the slides were presented, sudden bursts of loud noise occurred occasionally without warning. Measures of the strength of participants' *startle response* to these bursts were recorded, as well as the movements in their facial muscles related to overt signs of displeasure (such as frowning). It was known from previous research that for normal persons, the magnitude of the startle response is larger in the presence of unpleasant slides than in the presence of pleasant ones. Thus, Patrick and his colleagues reasoned that if persons suffering from the antisocial personality disorder have reduced emotional reactions, they would *not* show larger startle reactions or larger movements in facial muscles when the bursts of noise occurred together with unpleasant slides than when they occurred with pleasant slides.

In fact, this is just what occurred. The group of prisoners with antisocial personality disorder did *not* show larger startle responses in the presence of the unpleasant slides; the other two groups did (see Figure 14.5). A similar pattern was found for movements of facial muscles: The antisocial prisoners did not show larger muscle movements in the presence of the unpleasant than the pleasant slides.

When combined with the findings of other studies (e.g., Harpur & Hare, 1990), these results indicate that persons suffering from the antisocial personality disorder do seem to show reduced emotional reactions to negative stimuli—those that are related to the possibility of punishment, pain, or imminent danger. In short, such persons may sometimes act in reckless or impulsive ways because they experience lower levels of emotion than do other persons in a wide range of situations.

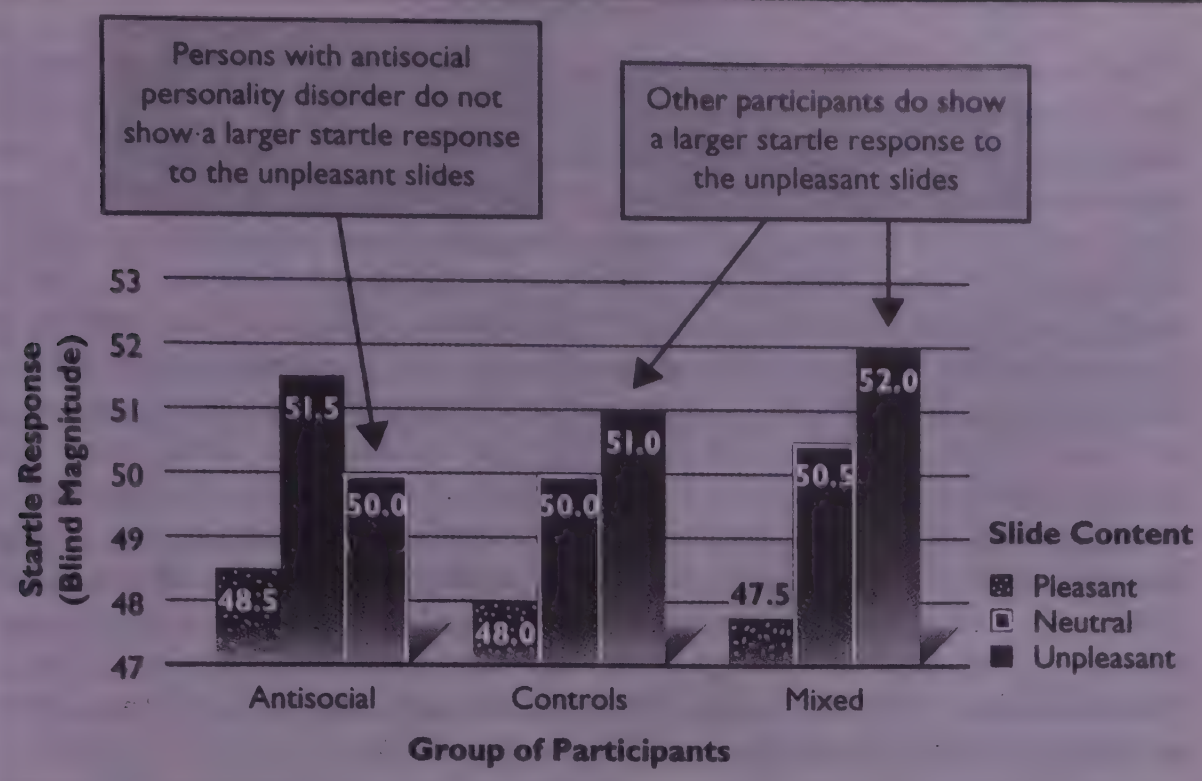


FIGURE 14.5

Reduced Emotionality and the Antisocial Personality

Research participants suffering from the antisocial personality disorder did not show larger startle reactions to unpleasant slides paired with bursts of noise than they did to neutral or pleasant slides. In contrast, other persons showed larger reactions to unpleasant slides. These findings suggest that persons with the antisocial personality disorder experience reduced emotional reactions to negative stimuli.
(*Source:* Based on data from Patrick, Bradley, & Lang, 1993.)

CRITICAL THINKING QUESTIONS

1. Persons with the antisocial personality disorder are not the only individuals to show low levels of fear: test pilots, fire fighters, and military heroes also show this characteristic. Does this imply that their brains, too, are abnormal in some respect? Or are there other possible explanations for the fearless behavior of such persons?
2. If the brains of persons with the antisocial personality disorder are somehow immature, why is this the case? Do you think this is a genetic disposition? Or could there be other factors, such as inadequate diet, that account for such effects?
3. All of the participants in the study conducted by Patrick and his colleagues were prisoners. What do you think would have occurred if a group of normal control participants had been included? Would they have showed even greater startle reactions in the presence of the unpleasant slides?
4. Assuming that persons with the antisocial personality disorder do often experience lower levels of emotional arousal than other persons, what does this suggest in terms of treating this disorder?

SCHIZOPHRENIA: Out of Touch with Reality

All of the disorders we've considered cause distress for the persons who experience them. Yet for the most part these persons can continue with their lives. Like people loaded down with lead weights, they toil and suffer, but generally can struggle on somehow. In contrast, individuals afflicted with **schizophrenia** are so disturbed that they usually cannot live ordinary lives. Indeed, in many cases, they must be removed from society, at least temporarily, for their own protection and to undergo treatment. Schizophrenia means "split mind," and modern definitions of the disorder reflect this meaning: All agree that it is a very serious disorder involving profound distortions of thought, perceptions, and affect (mood). What is the nature of schizophrenia? What are its major causes? These are the questions we'll now examine.

Schizophrenia: *A group of serious psychological disorders characterized by severe distortions in thought and language, perceptions, and emotion.*

The Basic Nature of Schizophrenia

Schizophrenia involves severe disruptions in virtually all aspects of psychological functioning. As noted recently by Heinrichs (1993, p. 221), schizophrenia depletes the mind's resources, just as severe brain damage depletes these resources. But while persons suffering from brain damage experience a world that is stripped of its meaning in many respects, those suffering from schizophrenia experience a world that has become, in Heinrich's words, ". . . excessively, terrifyingly rich in semantic possibilities. Instead of an inability to interpret experience, schizophrenia yields spurious experience in the form of hallucinations, or leads to . . . unwarranted interpretations of experience in the form of delusions. Instead of an inability to reason, schizophrenia produces a reasoning that it is so cryptic and obscure, it strikes the observer as incoherent." Let's look more closely at the major symptoms of this serious disorder. But first, one additional point: Although I'll discuss schizophrenia as though it is a single disorder, it's important to note that many experts believe that it may actually involve several different—and distinct—disturbances (Bellak, 1994; Heinrichs, 1993). Please keep this point in mind when we return to potential causes of schizophrenia below.

Disturbances of Thought and Language First, and perhaps foremost, schizophrenics do not think or speak like others. Their words jump about in a fragmented and disorganized manner. There is a loosening of associations, so that one idea does not follow logically from another; indeed, ideas often seem totally unconnected. In addition, schizophrenics often create words of their own—neologisms such as "littlehood" for childhood, or "crimery" for bad actions. Indeed, in extreme cases, their words seem to be totally jumbled into what psychologists term a *word salad*.

These problems, and several others, seem to stem from a breakdown in the capacity for *selective attention*. Normally we can focus our attention on certain stimuli while largely ignoring others. This is not true for schizophrenics. They are easily distracted by anything and everything. Even the sound of their own words may disrupt their train of thought and send them wandering off into a mysterious world of their own creation.

Schizophrenics also frequently suffer from **delusions**—firmly held beliefs that have no basis in reality. Such delusions can take many different forms. One common type is *delusions of persecution*—the belief that one is being plotted against, spied on, threatened, or otherwise mistreated. For example, Leopold Bellak (1994), a scientist who has studied schizophrenia for more than fifty years, describes a female patient who would shout "Here comes Bellak, the Russian spy!" from her window every morning as he approached the hospital building. Another common type is *delusions of grandeur*—the belief that one is extremely famous, important, or powerful. Persons suffering from such delusions may claim that they are the president, a famous movie or rock star, or even Jesus, Mohammed, or Buddha. Finally, schizophrenics also sometimes suffer from *delusions of control*—the belief that other people, evil forces, or perhaps even beings from another planet are controlling their thoughts, actions, or feelings, often by means of electronic devices implanted in or aimed at their brains. As you can see, schizophrenics' ties to reality are tenuous at best, and may seem almost nonexistent in some cases.

Delusions: *Irrational but firmly held beliefs about the world that have no basis in reality.*

Hallucinations: *Vivid sensory experiences that occur in the absence of any external stimuli.*

Disturbances of Perception Schizophrenics also show many signs of disturbed perceptions. Simply put, they do not perceive the world in the same way as other people do. Many experience **hallucinations** (described in chapter 4): vivid sensory experiences that have no basis in physical reality. The most common type of hallucinations are auditory. Schizophrenics "hear"

voices, music, or other sounds that aren't present. Visual hallucinations are also quite frequent; and, again, these experiences can be quite intense. Hallucinations of smells and tastes are sometimes also reported.

In addition, schizophrenics often experience deficits with respect to *social perception*—their ability to recognize the emotions of others (Morrison, Bellack, & Mueser, 1988). For example, they are less successful than normal persons in identifying others' facial expressions and in recognizing others' emotions from the tone of their voices (Kerr & Neale, 1993). However, since schizophrenics are also less successful than normal people in recognizing nonsense syllables and in recognizing faces generally, it appears that their difficulties in social perception reflect more general deficits in perception.

Disturbances of Emotion or Mood A third key symptom of schizophrenia involves inappropriate or unusual emotional reactions. Some schizophrenics show almost no emotion at all: They remain impassive in the face of events that evoke strong reactions from others. Others do show emotion, but their reactions are inappropriate. They may giggle when describing a painful childhood experience or when receiving tragic news. In sum, schizophrenics' disturbed patterns of thought, perception, and emotion weaken their grip on reality, and virtually ensure that they will live in a private world largely of their own creation.

Disturbances of Motor Behavior A fourth symptom of schizophrenia involves unusual actions. These can take an incredible range of forms, as the following description of a hospital ward for schizophrenics suggests:

> Lou stands hour after hour . . . just rubbing the palm of his hand around the top of his head. Jerry spends his days rubbing his hand against his stomach and running around a post. . . . Helen paces back and forth . . . mumbling about enemies who are coming to get her, while Vic grimaces and giggles over in the corner. . . . Nick tears up magazines, puts bits of paper in his mouth, and then spits them out. . . . Bill sits immobile for hours, staring at the floor . . . (Hagen, 1993).

Disturbances in Social Functioning Given the difficulties outlined above, it is far from surprising that schizophrenics also frequently show seriously impaired social functioning. Their relationships with others deteriorate, and they experience increasing social isolation and withdrawal (Bellack et al., 1990). Further, they show severe deficits in basic social skills, such as solving problems through conversation, compromising with others, and negotiating with them (Bellack et al., 1994). These problems and deficits play an important role in the poor quality of life experienced by most schizophrenics.

Positive versus Negative Symptoms As you can readily see, schizophrenia is a complex disorder. Are there any underlying dimensions that can help us make sense out of this vast range of diverse symptoms? One dimension that has proved useful—and that has provided insights into the nature of this disorder—divides symptoms into two types. *Positive symptoms* involve the presence of something that is normally absent, such as hallucinations and delusions. *Negative symptoms* involve the absence of something that is normally present and include withdrawal, apathy, absence of emotion, and so on. (These two groups are sometimes referred to as *Type I* and *Type II* schizophrenia, respectively.) Patients with negative symptoms generally have a poorer prognosis: They remain hospitalized longer and are less likely to recover than patients with positive symptoms (Fenton & McGlashan, 1991). In addition, patients with positive and negative symptoms appear to experi-

ence different kinds of cognitive deficits. Those with negative symptoms do worse on tests that measure visual and spatial skills; for example, they have more difficulty in recognizing visual stimuli. In contrast, patients with positive symptoms do worse on tests of short-term memory (Braff, 1989). These findings, as well as many others, indicate that there may be two distinct types of schizophrenia; and in fact, many experts believe that there may be several types (Heinrichs, 1993).

Subtypes of Schizophrenia

Although all schizophrenics show some of the symptoms outlined above, the overall pattern of these problems differs greatly. Largely on the basis of such differences, schizophrenia can be divided into several subtypes.

Paranoid Type As its name suggests, persons in this category have delusions of persecution—they see plots to harm them everywhere. These delusions are sometimes coupled with delusions of grandeur. Thus, such persons may claim that they possess tremendous power or wisdom or maintain that they are a famous figure from history, such as Napoleon, and are being persecuted by dangerous enemies.

Disorganized Type Persons suffering from this type of schizophrenia show disorganized speech, disorganized behavior, and flat or inappropriate affect. They are the ones most likely to use neologisms and to produce word salad. They sometimes have hallucinations or delusions, but these tend to be fuzzy or poorly developed. More common for this type are fits of giggling, making faces, and other childlike behavior.

Catatonic Schizophrenia In some respects this is the most bizarre form of all. Persons suffering from *catatonic schizophrenia* show marked disturbances in motor behavior. Many alternate between total immobility—they sit for days or even weeks frozen in a single posture—and wild, excited activity. In the latter state they sometimes engage in violent behavior, so this condition can be quite dangerous. When immobile, some catatonic schizophrenics show *waxy flexibility*. Their limbs can be moved and remain in the position into which they are arranged. Yet persons suffering from this form of schizophrenia also seem to be aware of the world around them. Sometimes they do not merely refuse requests—they do the opposite.

Catatonic Schizophrenia

People who suffer from catatonic schizophrenia may remain totally immobile, frozen in a single posture for long periods of time.

The Origins of Schizophrenia

Schizophrenia is certainly one of the most bizarre—and serious—psychological disorders. It is also more common than you might guess: Between 1 and 2 percent of all people in the United States have had or will have a schizophrenic episode during their lives (Robins et al., 1984). What are the causes of this disorder? Systematic research suggests that many different factors play a role.

Genetic Factors Schizophrenia, like several other psychological disorders, tends to run in families. The closer the family relationship between two individuals, the higher the likelihood that if one develops schizophrenia, the other will show this disorder too (Nicole & Gottesman, 1983); see Figure 14.6.

Evidence suggesting that genetic factors play a role in schizophrenia is provided by studies of twins (Kendler & Robinette, 1983). For example, researchers have studied the children of twin pairs in which one twin is schizophrenic and the other is not. Clearly, being raised by a schizophrenic parent is very different from being raised by a nonschizophrenic parent.

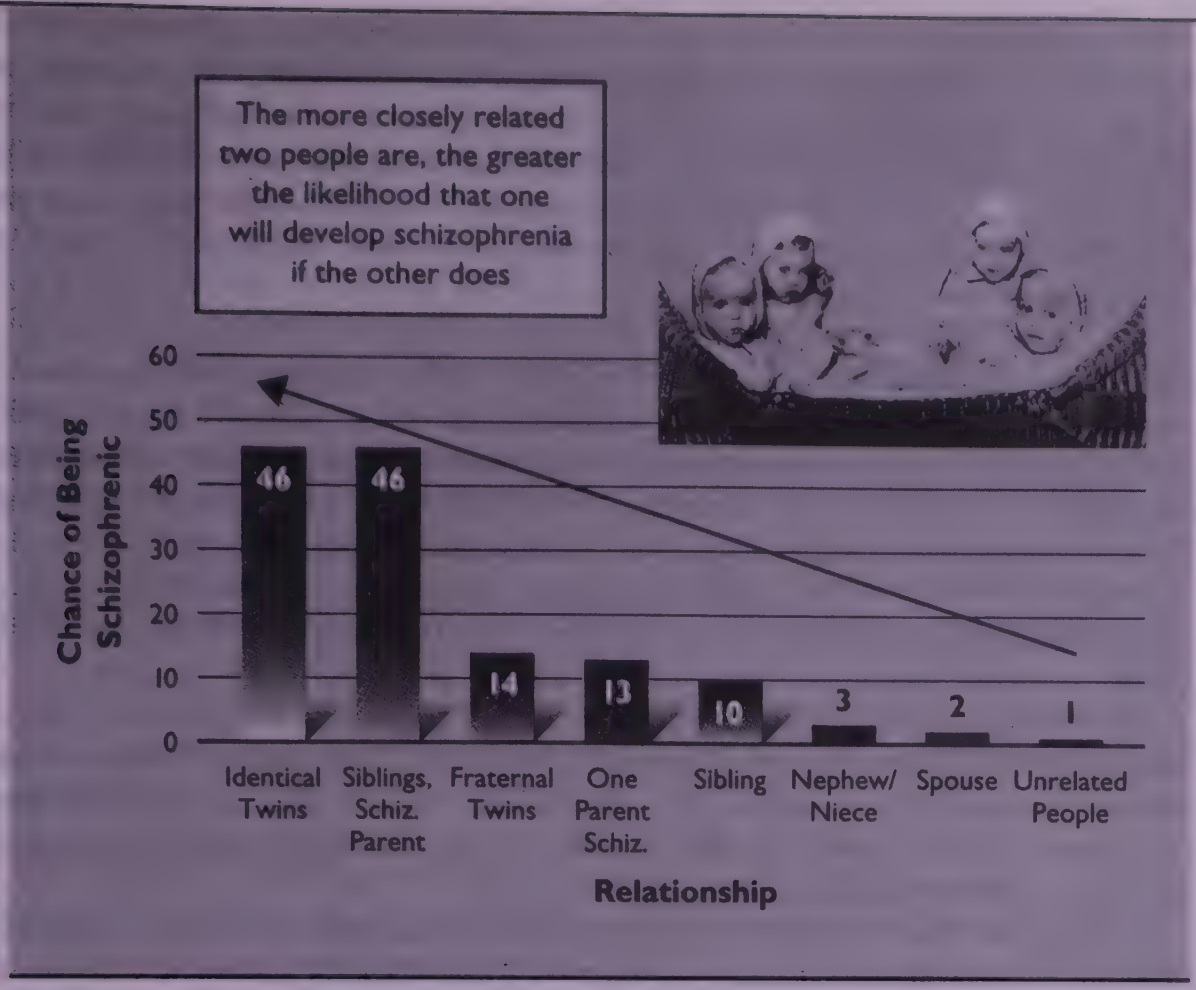


FIGURE 14.6

Family Relationship and Schizophrenia

The more closely two individuals are related, the greater the likelihood that if one develops schizophrenia, the other will too. This finding suggests that genetic factors play a role in the occurrence of schizophrenia. (The babies shown here are the Genain quadruplets, a classic example of genetic influence.)

Thus, if cousins show similar rates of schizophrenia despite this difference, strong evidence for the role of genetic factors would be obtained. In fact, this is just what such studies have shown (Gottesman & Bertelsen, 1989). The rates of schizophrenia among children raised by schizophrenic and nonschizophrenic twins were 16.8 and 17.4 percent, respectively. These and other large-scale studies of twins and families (e.g, Kety, 1988) provide convincing evidence for the importance of genetic factors in schizophrenia.

At this point I should emphasize that what is inherited with respect to schizophrenia is not this disorder itself, but rather a predisposition (a *diathesis*) to develop it under conditions of high environmental stress. In other words, even if an individual is at high risk for developing schizophrenia because of genetic factors, she or he may not do so if the environment in which the person lives is relatively supportive and benign. Only when a genetically inherited predisposition is coupled with stressful conditions does schizophrenia develop. This is known as the **diathesis-stress model** and is accepted by many researchers investigating the nature of schizophrenia.

FAMILY FACTORS As we have already seen, the fact that schizophrenia seems to run in families provides evidence for the role of genetic factors in this disorder. It also raises the possibility that some families create social environments that place their children at risk—environments that increase the likelihood of their developing schizophrenia. What are these environments like? Research findings provide some intriguing answers.

First, it appears that in such families, children are exposed either to high levels of conflict between the parents (*schismatic families*) or to a situation in which all power rests with one parent and calm prevails for this reason (*skewed families)* (Arieti, 1974). Apparently, for at least some children, both conditions are disturbing and increase their risk of developing schizophrenia.

Diathesis-Stress Model: *A model of schizophrenia suggesting that persons with inherited dispositions to develop this disorder do so only when subjected to stressful environmental conditions.*

Second, families with a greater than expected incidence of schizophrenia are ones in which patterns of communication are confusing and upsetting to children. Several studies indicate that the families of schizophrenics express high levels of criticism and emotional overinvolvement toward them (e.g., Miklowitz et al., 1989). In short, family members appear to be very concerned with the patients' well-being but at the same time are highly critical of them—often, for their illness!

COGNITIVE FACTORS Earlier, we saw that schizophrenics are less accurate than normal people in judging the emotions of others (Kerr & Neale, 1993). Actually, this is just one piece of a larger pattern suggesting that schizophrenia involves—and may partly stem from—deficits in cognitive functioning. First, schizophrenics, especially those with positive symptoms (Type I schizophrenia), show reduced ability to ignore irrelevant or distracting stimuli (e.g., Braff & Geyer, 1990; Elkins, Cromwell, & Asarnow, 1992; Grillon et al., 1990).

In contrast, schizophrenics suffering from negative symptoms (Type II schizophrenia) seem to show opposite problems: They are *under*attentive to external stimuli. For example, they often show weaker than normal *orienting responses*—physiological reactions indicative of attention—when unfamiliar stimuli are presented (Bernstein, 1987).

It appears that schizophrenics experience several kinds of cognitive deficits. Moreover, the precise pattern of these deficits seems to vary with their symptoms, and especially with whether these are positive or negative in nature.

BIOCHEMICAL FACTORS Consider the following observations: (1) Large doses of *amphetamines* produce patterns of behavior highly similar, in some respects, to those observed in some types of schizophrenia—for example, delusions of persecution and hallucinations. (2) Amphetamines seem to produce such effects by increasing levels of, or sensitivity to, the neurotransmitter *dopamine*. (3) Drugs effective in treating schizophrenia, such as the phenothiazines, block the brain's receptor sites for dopamine (e.g., Farde et al., 1988). When these observations are combined, it seems reasonable to suggest that schizophrenia may stem, at least in part, from excess activity in those parts of the brain that use dopamine as a neurotransmitter. This is the **dopamine hypothesis** of schizophrenia.

Evidence for this hypothesis is provided by the finding that the brains of deceased schizophrenics show increased dopamine and a higher than normal number of dopamine receptors (Mackay et al., 1982). Further, PET scans of the brains of living schizophrenics have sometimes (though not always) indicated an increased number of dopamine receptors in the limbic system (Wong et al., 1986). Such findings seem to apply primarily to schizophrenics with Type I schizophrenia.

I should hasten to add that while such evidence supports the dopamine hypothesis, not all findings are consistent with it. For example, schizophrenics who show improvement after taking dopamine-blocking drugs improve gradually over a period of about six weeks—not immediately. Yet it takes only a few hours for such drugs to block dopamine receptors within the brain. If schizophrenia resulted solely from dopamine-stimulated activity, the effects of these drugs should be visible very quickly (Pickar, 1988). Similarly, antipsychotic drugs that block the activity of dopamine relieve the symptoms of many serious forms of psychological disorder, not just schizophrenia. These findings suggest that while the dopamine hypothesis may provide important insights into the biochemical nature of schizophrenia, it by no

Dopamine Hypothesis: The hypothesis that schizophrenia is associated with excess activity in those parts of the brain in which dopamine is the primary neurotransmitter.

means offers a complete picture of the biochemical imbalances that contribute to this disorder.

Brain Structure Finally, growing evidence suggests that schizophrenia may also stem from subtle but important damage to various portions of the brain. In particular, it appears that among schizophrenics, brain *ventricles*—cavities within the brain containing cerebrospinal fluid—are enlarged relative to those of persons not suffering from this disorder (Raz & Raz, 1990). Moreover, the longer individuals have been hospitalized for schizophrenia, and therefore the more serious their condition, the greater the degree of ventricular enlargement. Such enlargement, which may stem from damage to or atrophy of brain tissue in adjoining areas, seems to be quite general, involving many areas of the brain (e.g., Raz, 1993).

Additional evidence suggests that it is damage in the frontal lobes and in certain subcortical regions (temporal limbic structures) that may be most closely linked to the symptoms of schizophrenia (e.g., Barta et al., 1990; Jernigan et al., 1991). Once again, however, the pattern may be different for persons with Type I and Type II schizophrenia; definite conclusions are not yet possible.

In sum, it appears that genetic factors, certain types of home environments, and brain structure and function may all be related to the occurrence of schizophrenia. It remains for future research to determine the precise manner in which such factors combine to place specific persons at risk for the development of this serious psychological disorder.

Chronic Mental Illness and the Homeless

In the mid-1990s a visit to the downtown area of almost any large American city can be a shock. Huddled in doorways, sprawled on park benches, clustered around open fires in winter are the *homeless*—people who live on the street, without any permanent home of their own. Such persons are there for many reasons, including economic dislocation and lack of affordable housing, but one important factor is certainly mental illness. Many homeless persons are suffering from schizophrenia, mood disorders, and other serious psychological problems (Burt, 1992). Perhaps as many as one-third previously received care in hospitals, but were released when drug therapy reduced their symptoms. With nowhere to go, they turned to the streets, where they soon succumbed to the temptations of alcohol and other drugs that were *not* part of their treatment. Given the number of persons released from large state institutions in recent decades (see chapter 15), it is hardly surprising that the ranks of the homeless—and the *chronically mentally ill*—have swelled greatly.

Of course, not all homeless persons fit this description; but enough do to suggest the need for new programs designed to get those in need of psychological help into settings where they can receive it. The cost of doing so may be high, but ignoring this problem in the hope that it will go away by itself does not seem to be either a humane solution or a viable one.

Key Points

- Schizophrenia involves severe disturbances in thought, perception, affect, and motor behavior.
- Some schizophrenics show positive symptoms—reactions that are not present in normal persons; others show negative symptoms—the absence of normal reactions.
- Several distinct types of schizophrenia exist, including paranoid, disorganized, and catatonic.
- Schizophrenia has complex origins and may involve many different factors, such as genetics, family structure and functioning, biochemical factors, deficits in cognitive functioning, and damage to specific regions of the brain.
- Many homeless persons appear to be individuals suffering from serious psychological disorders such as schizophrenia or mood disorders.

Making Psychology Part of Your Life

Preventing Suicide: Some Basic Steps

When terminally ill persons choose to end their lives rather than endure continued pain and suffering, their actions are understandable, even if we disapprove of them on moral or religious grounds. But when young persons whose lives have just begun follow the same route, nearly everyone would agree that the death is tragic. Preventing such suicides is *crucial*. Is there anything you as an individual can do to help prevent suicide? Research findings suggest that there is.

1. *Take all suicide threats seriously.* One common myth about suicide is that people who threaten to kill themselves really won't; only those who tell no one about their plans will actually commit this act. *This is untrue!* Approximately 70 percent of all suicides communicate their intentions to others within a few months of their deaths. Thus, whenever someone talks about suicide, you should take it seriously.

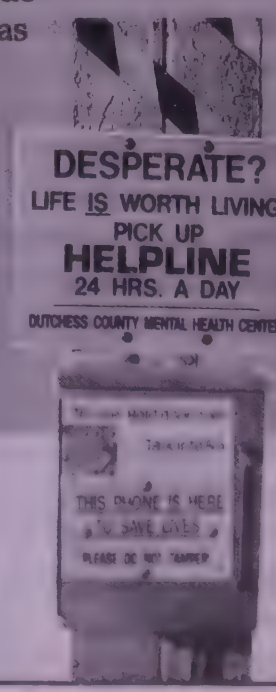
2. *If someone mentions suicide, don't be afraid to discuss it.* Another common myth about suicide—and a dangerous one—is that one should never discuss suicide with another person; this will only add to the person's suicidal tendencies. This belief, too, is false. Encouraging people to talk about such thoughts gets them out into the open and can be helpful. It lets these people know that you are interested, and allows you to gather information you can pass on to counselors and others. So don't be afraid to discuss this matter with potential suicides if it arises.

3. *Recognize the danger signs.* These include (a) statements by someone that he or she has no strong or compelling reasons for living; (b) agitation or excitement followed by a period of calm resignation; (c) sudden efforts to give valued possessions away to others; (d) direct statements such as "I don't want to be a burden any more" or "I don't really want to go on living"; (e) revival from a deeply depressed state. If you observe these changes in others, along with other indications that they are contemplating suicide, the situation may well be a serious one.

4. *Discourage others from blaming themselves for failure to attain unrealistic standards.* Many persons who attempt suicide do so because they feel that they have fallen far short of their own expectations and standards. Unfortunately, in many cases, these are unrealistically high—so high that almost no one could hope to attain them. If you hear someone you know criticizing herself or himself for such "failure," try to intervene by pointing out that these standards are exceptionally high, and by calling attention to the person's successes and good points. This may help break a downward cycle that can ultimately lead to thoughts of suicide.

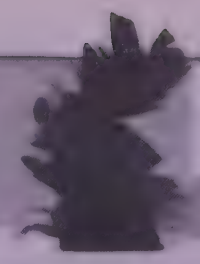
5. *If a friend or family member shows the danger signs described above, don't leave him or her alone.* With rare exceptions, suicide is a solitary act. So if you are concerned that someone you know is seriously contemplating such an action, don't leave him or her alone. If you can't stay with the person, get others to help or bring the person with you.

6. *Most important of all: Get help!* Perhaps the most important point to keep in mind is this: Determining whether someone is at risk for suicide is a complex judgment—one that is difficult even for trained experts. Thus, you should definitely *not* try to make this judgment for yourself. Rather, if you have even the slightest concern that someone you know is seriously thinking of suicide, *seek professional help*. Call a local suicide hot line; or discuss your concerns with a physician, psychologist, counselor, or member of the clergy. And, if possible, try to get the person to seek help from one or more of these sources. Don't be afraid of overreacting. In signal-detection theory terms, this is one of those cases where a miss (failing to notice suicidal tendencies when they are present) is *much* worse than a false alarm (concluding that suicidal tendencies are present when in fact they are not).



There are a number of steps you can take to help someone who may be in danger of taking his or her own life.

Summary and Review of Key Points



Changing Conceptions of Psychological Disorders Key Terms: psychological disorders, p. 544 trephining, p. 545 medical perspective, p. 546 psychiatry, p. 546	• Ideas concerning the nature of abnormal behavior have changed greatly over the centuries. It was viewed as the result of supernatural forces until well into the eighteenth century. This view was replaced by the medical model, which sees psychological disorders as forms of mental illness. Psychologists recognize the importance of biological factors in many forms of abnormal behavior, but they also emphasize the key role of psychological processes, such as cognition and learning, and the impact of sociocultural factors.
Identifying Psychological Disorders: The DSM-IV Key Term: Diagnostic and Statistical Manual of Mental Disorders, p. 549	• In order to improve the accuracy with which psychological disorders are diagnosed, many mental health professionals use the Diagnostic and Statistical Manual of Mental Disorders. The newest version of this manual, DSM-IV, represents improvements over earlier versions in several respects, including a firmer basis in published research. • The DSM-IV provides descriptions of a wide range of psychological disorders and associated conditions. It uses a multiaxial approach in which disorders are classified along five different axes. • In contrast to earlier versions, the DSM-IV directs increased attention to the impact of cultural factors on psychological disorders.
Mood Disorders Key Terms: mood disorders, p. 554 depression, p. 554 bipolar disorder, p. 554 learned helplessness, p. 555 self-schemas, p. 555 suicide, p. 557	• Persons suffering from depression, one important form of mood disorder, experience negative moods, reduced energy, feelings of hopelessness, loss of interest in previously satisfying activities, difficulties in sleeping, and recurrent thoughts of death. Depression is more common among women than among men. In bipolar disorders, individuals experience wide swings of mood from mania (elation) to deep depression. • Mood disorders tend to run in families; thus, genetic factors play a role in their occurrence. Depression also seems to involve disturbances in brain activity and biochemistry. Psychological factors such as learned helplessness, tendencies to attribute negative outcomes to internal causes, and negative perceptions of oneself and others are also involved. • Suicide is a major cause of death among young people. Individuals are more likely to attempt suicide when they have recovered to some extent from depression than when they are in the depths of despair.
Anxiety Disorders Key Terms: anxiety, p. 559 anxiety disorders, p. 559 panic attack disorder, p. 559 agoraphobia, p. 559 obsessive-compulsive disorder, p. 560	• Anxiety disorders involve increased arousal accompanied by generalized feelings of fear or apprehension. Panic attacks involve symptoms of arousal coupled with intense fear—often of losing control in some specific situation. Both biological factors and learning seem to play a role in their occurrence. • Phobias are excessive fears focused on specific objects or situations. Obsessive-compulsive disorder involves repetitious thoughts or actions individuals seem unable to control. • Persons suffering from anxiety disorders seem to direct more of their information-processing capacity than others to anxiety-related stimuli.

SOMATOFORM DISORDERS Key Terms: somatoform disorders, p. 563 somatization disorder, p. 563 hypochondriasis, p. 564 conversion disorder, p. 564	• In Somatoform disorders psychological problems find expression in physical symptoms for which there are no apparent biological causes. In somatization disorder, individuals experience physical complaints for which there is no apparent physical basis. Hypochondriasis, another type of somatoform disorder, involves preoccupation with fears of disease. • In conversion disorders individuals suffer actual impairments in physical functioning, such as blindness, deafness, or loss of sensation. • Somatoform disorders may be explained by the rewards of the sick person role as well as by tendencies to attribute normal body sensations to serious causes.
DISSOCIATIVE DISORDERS Key Terms: dissociative disorder, p. 565 dissociative amnesia, p. 565 dissociative fugue, p. 565 dissociative identity disorder, p. 565	• Dissociative disorders involve profound losses of memory or identity. In dissociative amnesia individuals are unable to remember various events, especially ones they found traumatic or disturbing. • In dissociative identity (multiple personality) disorder , individuals seem to possess several distinct personalities, which alternate in controlling their behavior. Some evidence indicates that such disorders are real in at least some instances.
SEXUAL AND GENDER IDENTITY DISORDERS Key Terms: sexual desire disorders, p. 567 sexual arousal disorders, p. 567 paraphilias, p. 567	• Sexual dysfunctions involve disturbances in sexual desire, sexual arousal, or the ability to attain orgasm. Paraphilias are disturbances in which unusual imagery or acts are necessary for sexual arousal. • Persons suffering from gender identity disorder feel that they were born with the wrong sexual identity and seek to change this identity through medical treatment or other means.
EATING DISORDERS Key Terms: eating disorders, p. 568	• Eating disorders are common among young persons, especially women. Persons suffering from anorexia nervosa are afraid of being or becoming "fat"; consequently, they starve themselves and experience dangerous weight loss. • Persons suffering from bulimia nervosa engage in repeated cycles of binge eating and purging. Both anorexia nervosa and bulimia nervosa stem in part from dissatisfaction with one's appearance. In addition, bulimia nervosa involves reductions in taste sensitivity.
PERSONALITY DISORDERS Key Terms: personality disorders, p. 569 paranoid personality disorder, p. 570 schizoid personality disorder, p. 570 antisocial personality disorder, p. 570 modeling, p. 571	• Personality disorders involve traits that are inflexible and maladaptive and cause the persons who suffer them serious difficulties. The paranoid personality disorder involves pervasive mistrust of others. The schizoid personality disorder involves a pattern of total isolation from others. • Persons with the antisocial personality disorder show total disregard for the rights of others, coupled with reckless behavior, fearlessness, and inability to form close relationships. Research findings suggest that this disorder may stem both from early learning experiences and from biological factors such as reduced emotional reactions to threatening stimuli.

SCHIZOPHRENIA Key Terms: schizophrenia, p. 573 delusions, p. 574 hallucinations, p. 574 diathesis-stress model, p. 577 dopamine hypothesis, p. 578	• Schizophrenia is a very serious psychological disorder involving severe disturbances in thought, perception, affect, and motor behavior. Schizophrenics can be divided into those showing positive symptoms (reactions that are not present in normal persons) and those showing negative symptoms (the absence of normal reactions). Several distinct types of schizophrenia exist, including paranoid, disorganized, and catatonic. • Schizophrenia has complex origins, involving genetic factors, certain aspects of family structure, and biochemical factors. In addition, schizophrenics suffer from deficits in cognitive functioning. Schizophrenia may also be related to damage in several regions of the brain. • Many homeless persons appear to be individuals suffering from serious psychological disorders such as schizophrenia or mood disorders.

CRITICAL THINKING QUESTIONS

APPRAISAL	Psychologists generally agree that only behavior that is atypical and evaluated negatively in a given society should be labeled as "abnormal." This implies that there are no absolutes in distinguishing between abnormal and normal behavior. As long as a behavior is viewed as acceptable within a culture, it will be described as "normal." Do you agree with this perspective? If not, why?
CONTROVERSY	Growing evidence indicates that genetic factors can predispose individuals to develop certain forms of psychological disorder. In other words, some persons are at "high risk" in this respect. This evidence leads to the suggestion that perhaps we should invest resources in identifying those persons and taking steps to prevent their inherited dispositions from developing into serious psychological disorders. In order to do so, it would first be necessary to gather information on the genetic background of many people. Do you think that doing so is justified? Or should this kind of information be viewed as too private to allow for such projects?
MAKING PSYCHOLOGY PART OF YOUR LIFE	Near the beginning of this chapter I noted that many psychologists are uneasy with the term "mental illness." Now that you know much more about the many causes of psychological disorders, I hope you can appreciate more fully why this is so. Such disorders are not simply "diseases" in the classic sense of this word; they involve much more than the ravages of harmful microorganisms. In view of this fact—and it certainly is a fact—will you think differently about persons suffering from such disorders than you did before you read this chapter? And do you think that your greater understanding of the many causes of psychological disorders will change your reactions to those who are experiencing these problems, perhaps increasing your level of sympathy for them?

Therapy:

Diminishing the Pain of Psychological Disorders

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One of my favorite old songs starts "I beg your pardon, I never promised you a rose garden." I like the melody, but it's really the lyrics that stand out in my mind. Life is good, the song suggests, but it's definitely no rose garden—no Eden free of problems. A few statistics help to drive this point home:

- More than half of all college students report that they have thought about suicide at least once (Meehan et al., 1992), and about 10 percent of adolescents indicate that they have actually attempted suicide (Shaffer et al., 1991).

- About 10 percent of adults suffer from depression or related disorders at any given time (Strickland, 1992); almost half report that they have experienced a major depressive episode at some time in their life (Kessler et al., 1994).
- More than six million persons in the United States alone are currently involved in various kinds of self-help groups—groups focused on problems ranging from alcoholism and drug abuse to stuttering and the trauma of losing one's spouse.

Yes, there's certainly a lot of pain in life—more than enough psychological discomfort to go around. Yet there's no reason to despair, because there are also many effective techniques for alleviating such discomfort. Many procedures for treating various psychological disorders exist. To acquaint you with the most important of these, this chapter will proceed as follows.

First, we'll begin with **psychotherapies**—procedures in which a trained person establishes a professional relationship with the patient in order to remove or modify existing symptoms, change disturbed patterns of behavior, and promote personal growth and development (Wolberg, 1977). As you'll soon see, many forms of psychotherapy exist, ranging from *psychoanalysis*, the famous procedures devised by Freud, through modern procedures firmly founded on basic principles of learning and cognition. Next, we'll explore several forms of therapy that involve several persons rather than a single individual—*group therapies*. Third, we'll consider therapies focused on interpersonal relations—*marital* and *family therapy*. After reviewing these various forms of therapy, we'll turn to some basic questions about all these approaches: Are they successful in alleviating psychological disorders? And if so, are some more helpful than others? Next, we'll examine several *biologically based therapies*—efforts to deal with psychological disorders through biological means. Finally, we'll look at various *settings* for therapy. These range from large state institutions or other facilities providing full-time care through community health centers and other locations in which individuals generally receive treatment on a part-time outpatient basis.

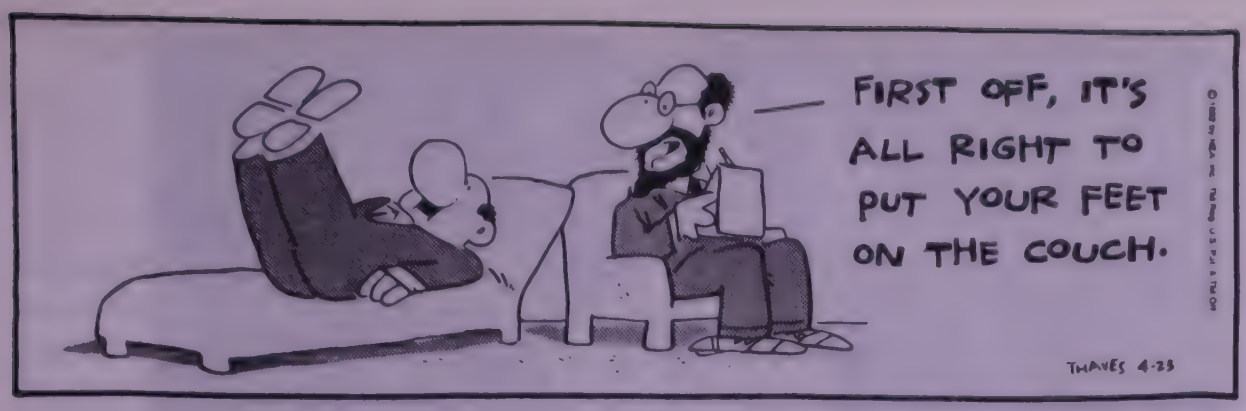
THERE'S CERTAINLY A LOT OF PAIN IN LIFE—MORE THAN ENOUGH PSYCHOLOGICAL DISCOMFORT TO GO AROUND.

PSYCHOTHERAPIES: Psychological Approaches to Psychological Disorders

Psychotherapies: Procedures designed to eliminate or modify psychological disorders through the establishment of a special relationship between a client and a trained therapist.

Say the word *psychotherapy* and many people quickly conjure up the following image: A "patient" lies on a couch in a dimly lit room, while a therapist sits in the background. The therapist urges the patient to reveal the deepest secrets of her or his mind—hidden urges, frustrated desires, traumatic early experiences. As these painful revelations are brought to the surface, the patient, suffering much emotional turmoil, moves toward psychological health.

This popular image, however, has little to do with many modern forms of psychotherapy. In fact, it applies primarily to only one type, an approach developed by Freud that is now rarely used by psychologists (although it is still used by some psychiatrists). Psychotherapy, as it is currently practiced by psychologists and other professionals, actually occurs in many different



PSYCHOTHERAPY AS MANY PEOPLE SEE IT

This is the kind of scene many people imagine when they hear the term *psychotherapy*.
(*Source*: FRANK & ERNEST reprinted by permission of NEA, INC.)

settings, employs a tremendously varied range of procedures, and can be carried out with groups as well as with individuals.

What do these diverse procedures have in common? Most psychologists agree that two features are crucial: (1) establishment of a special relationship, sometimes known as the **therapeutic alliance**, between a person experiencing psychological distress and a trained therapist—a relationship in which the distressed person feels free to reveal important and often embarrassing facts and has confidence in the therapist's genuine desire to help; and (2) efforts by the therapist to bring about beneficial changes in the client's behavior, feelings, or thoughts. In short, whatever form it takes, psychotherapy strives to place disturbed individuals in an environment in which they feel free to confide in another human being who is specially trained to help them change in beneficial ways. Let's take a closer look at several important forms of psychotherapy.

PSYCHODYNAMIC THERAPIES: From Repression to Insight

Psychodynamic therapies are based on the assumption that abnormal behavior stems primarily from the complex inner workings of personality. More specifically, psychological disorders occur because something has gone seriously wrong with the balance of these hidden inner forces. Several forms of therapy are based on these assumptions, but the most famous is *psychoanalysis*, the approach developed by Sigmund Freud.

PSYCHOANALYSIS If Freud had known how many movies, television shows, and even cartoons would be based on his method of psychotherapy, he just might have changed it in several respects. He was a serious person who viewed himself as essentially scientific in orientation, and he would probably have found popular representations of his work thoroughly distasteful. But, as is often the case, there is a grain of truth in media representations of psychoanalysis: Freud *did* use a couch, and he *did* employ several other techniques that have become part and parcel of our culture's conception of psychotherapy.

In order to understand Freud's methods, let's begin by briefly reviewing the reasoning that lay behind them. As you may recall from chapter 12, Freud believed that personality consists of three major parts: *id*, *ego*, and *superego*, which correspond roughly to desire, reason, and conscience. Freud suggested that psychological disorders stem from the fact that many impulses of the id are unacceptable to the ego or the superego and are therefore *repressed*—driven into the depths of the unconscious. There they persist, and individuals must devote a considerable portion of their psychic energy to keeping them

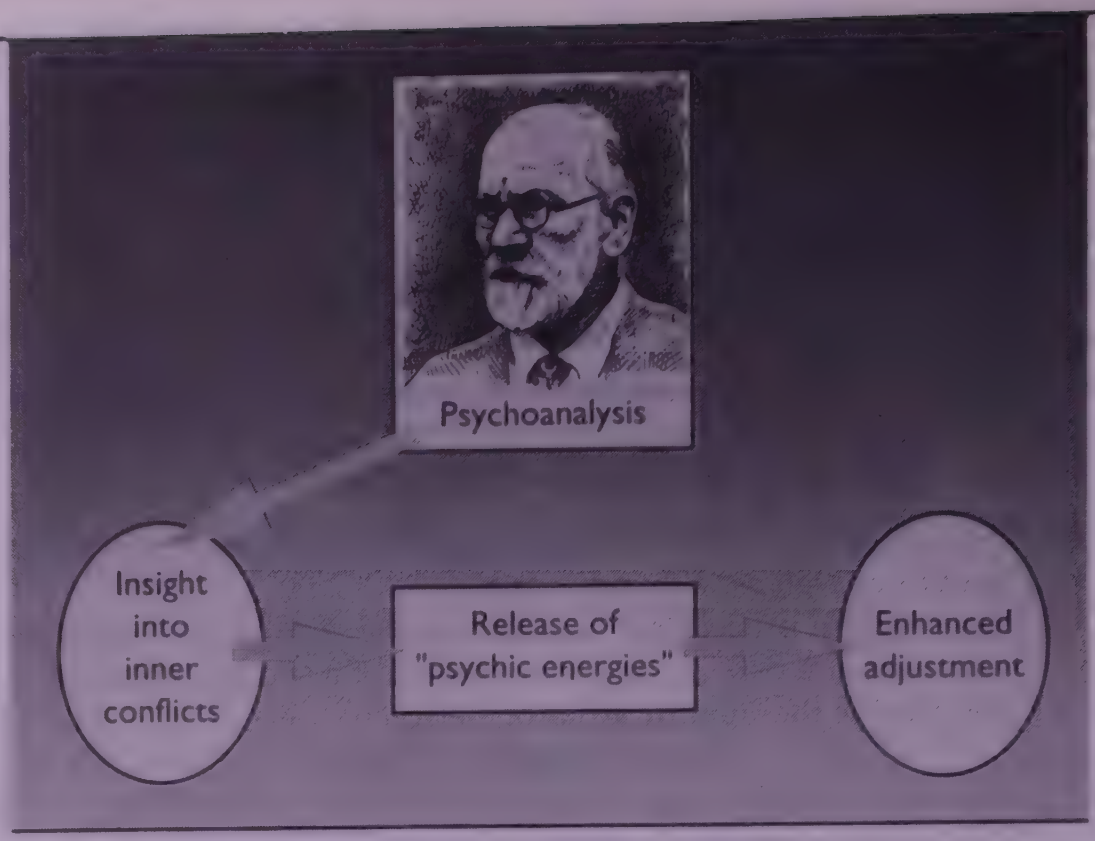
Therapeutic Alliance: *The special relationship between therapist and client that contributes to the effectiveness of many forms of psychotherapy.*

Psychodynamic Therapies: *Therapies based on the assumption that psychological disorders stem primarily from hidden inner conflicts with repressed urges and impulses.*

FIGURE 15.1

Psychoanalysis: An Overview of Its Major Goals

According to Freud's theory, psychotherapists can overcome psychological disorders by helping individuals gain insight into their hidden inner conflicts. Once such insight is obtained, presumably, it will no longer be necessary to devote "psychic energies" to repressing unacceptable impulses, and the disorders caused by these conflicts and their repression will disappear.



FREUD'S FAMOUS COUCH

This scene of Freud's London office, which he opened after fleeing Nazi persecution in Germany, shows the famous couch.

Free Association: *A key procedure in psychoanalysis in which individuals spontaneously report all thoughts to the therapist.*

Resistance: *Efforts by individuals undergoing psychoanalysis to prevent repressed impulses or conflicts from entering consciousness.*

in check and out of conscious experience—and to various *defense mechanisms* that protect the ego from feelings of anxiety. In short, Freud believed that hidden conflicts among the basic components of personality, if left unresolved, interfere with normal psychosexual development and so cause psychological disorders.

How can such problems be relieved? Freud felt that the crucial task was for people to overcome repression and come face to face with their hidden feelings and impulses. Having gained such insight into their inner conflicts, they would experience a release of emotion known as *abreaction*, and then, with their energies at last freed from the task of repression, they could direct these into healthy growth. Figure 15.1 summarizes these suggestions.

These ideas concerning the causes and cure of mental illness are reflected in the specific procedures used in psychoanalysis. As popular images suggest, the patient undergoing psychoanalysis lies on a couch in a partly darkened room and engages in **free association**. This involves reporting everything that passes through her or his mind, no matter how trivial it may appear to be. Freud believed that the repressed impulses and inner conflicts present in the unconscious would ultimately be revealed by these mental wanderings, at least to the trained ear of the analyst. As we saw in chapter 4, he felt that dreams were especially useful in this respect, since they often represented inner conflicts and hidden impulses in disguised form. As psychoanalysis progresses and the analyst gains understanding of the patient's problems, he or she asks questions and offers suggestions designed to enhance the patient's awareness of inner conflicts. It is through this process of *interpretation* that the patient finally gains increased insight.

During the course of psychoanalysis, Freud reported, several intriguing phenomena often occur. The first of these is **resistance**—a patient's refusal to report certain thoughts, motives, and experiences or overt rejection of the analyst's interpretations (Strean, 1985). Presumably, resistance occurs because of patients' desire to avoid the anxiety produced as threatening or painful thoughts come closer and closer to consciousness.

Another aspect of psychoanalysis is **transference**—intense emotional feelings of love or hate toward the analyst on the part of the patient. Often, patients react toward their analyst as they did to an earlier crucial person in their lives—for example, one of their parents. Freud believed that the transference relationship could be an important tool for helping individuals work through conflicts regarding their parents, this time in a setting where the harm done by undesirable early relationships could be effectively countered. As patients' insight increases, transference gradually decreases and ultimately fades away.

PSYCHOANALYSIS: AN EVALUATION Psychoanalysis is probably the best-known form of psychotherapy. As noted by Hornstein (1992), early efforts by psychologists to ignore it (through the 1920s) and later to discredit it (in the 1930s and 1940s) largely failed: Psychoanalysis gained a firm grip on the public consciousness and refused to vanish, no matter how fervently psychologists trying to build a scientific field wished it to do so. Indeed, even one of the founders of experimental psychology—Edwin Boring—chose to undergo psychoanalysis when he experienced deep depression. To protect his reputation at the time (1934), Boring claimed that he was studying the relationship between psychology and psychoanalysis; in reality, though, he hoped for major benefits from this form of treatment (Hornstein, 1992). But he was bitterly disappointed. After ten months during which he saw his analyst four times a week, he concluded that the therapy had failed: He was no better off than before he entered treatment.

Unfortunately, Boring's experience seemed to be typical of the outcome of classical psychoanalysis: in general, its effectiveness has failed to match its fame. In the form proposed by Freud, it suffers from several major drawbacks that lessen its value. First, psychoanalysis is a costly and time-consuming process. Several years and large amounts of money are usually required for its completion. Second, it is based largely on Freud's theories of personality and psychosexual development. As chapter 12 explained, these theories are provocative but difficult to test scientifically. Third, Freud designed psychoanalysis for use with educated persons who already possessed high verbal skills. This limits the usefulness of psychoanalysis to what some have described as YAVIS patients—young, attractive, verbal, intelligent, and successful (Schofield, 1964). Other people, including many who may be desperately in need of psychological assistance, are left largely out in the cold (Snowden & Cheung, 1990). Finally, and perhaps most important, psychoanalysis has often adopted the posture of a closed logical system: A critic who raises questions about its validity or effectiveness is described as suffering from resistance and as showing severe psychological problems that prevent him or her from recognizing the obvious value of psychoanalysis! So, in sum, psychoanalysis has not turned out to be the major breakthrough that Freud predicted. While it may help some persons gain insights into their own personalities, it does not appear to be practical or highly effective in treating a wide range of psychological disorders.

BEYOND PSYCHOANALYSIS: PSYCHODYNAMIC THERAPY TODAY Because of such problems, classical psychoanalysis is a relatively rare type of therapy today. However, modified versions introduced by Freud's students and disciples, including the neo-Freudians we discussed in chapter 12, are in more common use. These modified forms of psychodynamic therapy are usually briefer than classical psychoanalysis, requiring months rather than many years of treatment (Strupp & Binder, 1984), and focus less on the past than on patients' present life and personal relationships. A couch is seldom used;

Transference: *Strong positive or negative feelings toward the therapist on the part of individuals undergoing psychoanalysis.*

KEY POINTS

- Psychotherapy involves establishing a special relationship between a trained professional and a distressed person, plus efforts by the therapist to bring about beneficial changes in the client's behavior, feelings, or thoughts.
- Psychodynamic therapies such as psychoanalysis are based on the view that psychological disorders stem largely from hidden conflicts.
- Classical Freudian psychoanalysis is very famous, but there is little evidence for its effectiveness.
- Modern psychodynamic therapies focus more on patients' current problems than on their past histories.

instead, client and therapist sit face to face. And the therapist plays a more active role than in classical psychoanalysis, directing and advising rather than merely listening most of the time. Modern forms of psychodynamic therapy put less emphasis on the role of unconscious inner conflicts and devote more attention to current ego functioning—how the ego acts as a controlling agent in the individual's life. In addition, social factors in the environment in which clients live are considered, and efforts are made to change these in beneficial ways. Despite these differences, however, the basic goal remains the same: helping patients gain insight into their hidden motives and conflicts.

HUMANISTIC THERAPIES: Emphasizing the Positive

Freud was something of a pessimist about basic human nature. He felt that we must constantly struggle with primitive impulses from the id. As we saw in chapter 12, many psychologists reject this view. They contend that people are basically good and that our strivings for growth, dignity, and self-control are just as strong as—if not stronger than—the powerful aggressive and sexual urges Freud described. According to such *humanistic* psychologists, psychological disorders do not stem from unresolved inner conflicts. Rather, they arise because the environment somehow interferes with personal growth and fulfillment.

Such views, of course, lead to forms of psychotherapy that are very different, both in purpose and procedure, from those developed by Freud. **Humanistic therapies** focus on the task of helping *clients* (note that humanistic therapists dislike the term "patient") to become more truly themselves—to find meaning in their lives and to live in ways consistent with their own inner values and traits. Unlike psychoanalysts, humanistic therapists believe that clients, not they, must take essential responsibility for the success of therapy. The therapist is primarily a guide and facilitator, *not* the one who runs the show. Let's take a closer look at several major types of humanistic therapy.

Humanistic Therapies: *Forms of psychotherapy based on the assumption that psychological disorders stem from environmental conditions that block normal growth and development.*

Client-Centered Therapy: *A form of psychotherapy that concentrates on eliminating irrational conditions of worth—conditions people believe they must meet in order to be loved or accepted.*

Conditions of Worth: *In Rogers's theory, individuals' beliefs that they must meet certain unrealistic conditions in order to be loved or accepted.*

PERSON-CENTERED THERAPY: THE BENEFITS OF BEING ACCEPTED Perhaps the most influential humanistic approach is the **client-centered therapy** developed by Carl Rogers (1970, 1980). Rogers strongly rejected Freud's view that psychological disorders stem from conflicts over the expression of primitive, instinctive urges. On the contrary, he argued that such problems arise primarily out of a distorted *self-concept*. According to Rogers, individuals often acquire what he terms unrealistic **conditions of worth** early in life. That is, they learn that they must be something other than what they really are in order to be loved and accepted. For example, they come to believe that they will be rejected by their parents if they harbor hostility toward their siblings. In response to such beliefs, people refuse to recognize large portions of their experience and emotions—any portions that violate their implicitly accepted conditions of worth. This in turn interferes with normal development of the self and causes people to suffer from various forms of maladjustment.

Person-centered therapy, as explained in chapter 12, focuses on eliminating such unrealistic conditions of worth through creation of a psychological climate in which clients feel valued as persons. Person-centered therapists offer *unconditional acceptance*, or *unconditional positive regard*, of the client and

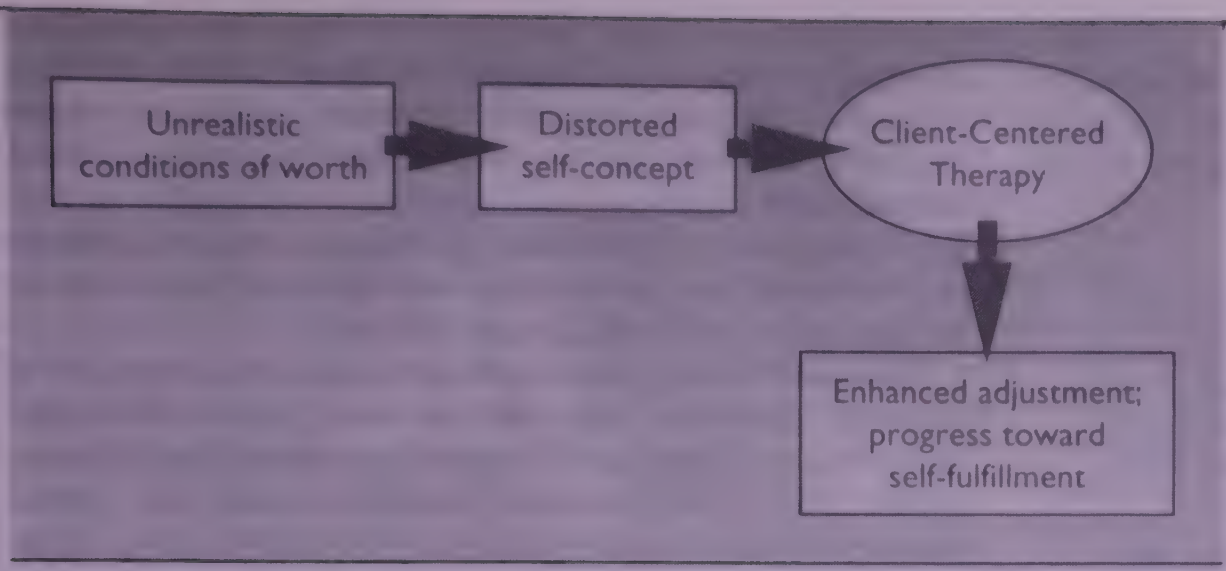


FIGURE 15.2

The Nature of Client-Centered Therapy

Rogers (1959) believed that psychological disorders stem from unrealistic *conditions of worth*—conditions people believe they must fulfill in order to be loved and accepted. These produce distortions in the self-concept. Client-centered therapy is designed to eliminate such distortions by placing clients in an environment in which they receive *unconditional positive regard* from the therapist and feel valued as persons.

her or his feelings; a high level of *empathetic understanding;* and accurate reflection of the client's feelings and perceptions. In the context of this warm, caring relationship, freed from the threat of rejection, individuals can come to understand their own feelings and accept even previously unwanted aspects of their own personalities. As a result, they come to see themselves as unique human beings with many desirable characteristics. To the extent such changes occur, Rogers suggests, many psychological disorders disappear and individuals can resume their normal progress toward self-fulfillment (see Figure 15.2).

GESTALT THERAPY: BECOMING WHOLE The theme of faulty or incomplete self-awareness so prominent in client-centered therapy is echoed in a second humanistic approach, **Gestalt therapy** (Perls, 1969). As noted in chapter 3, the German word *gestalt* means "whole," and this word captures the essence of Gestalt therapy. According to Fritz Perls (1969), originator of this form of psychotherapy, individuals often experience difficulties because key aspects of their emotions are not acknowledged in consciousness. In short, they have, in a sense, psychologically disowned parts of their own being. They must recapture these before they can attain an accurate and complete self-concept.

How can progress toward this goal be achieved? Gestalt therapists use many different tactics. They may directly challenge their clients to give up their "phony games" and see themselves accurately. They may ask them to portray unresolved conflicts, a process referred to as *taking care of unfinished business.* At such times, clients are urged to reexperience their emotions vividly—to scream, swear, or weep as the need arises. Presumably, once such feelings are recognized and released, the unfinished business will be completed and the client will become whole once again.

Some of the techniques Gestalt therapists have developed for helping individuals recognize their own feelings are quite ingenious. For example, in the *two-chair exercise,* clients move back and forth between two chairs. While sitting in one they play themselves, while in the other they assume the role of some important person in their life—wife, husband, mother, father. The ultimate goal, of course, is to increase their awareness of their feelings toward, and relations with, these important persons in their lives.

Gestalt Therapy: *A form of humanistic psychotherapy designed to increase individuals' awareness and understanding of their own feelings.*

HUMANISTIC PSYCHOTHERAPY: AN OVERVIEW While humanistic psychotherapies differ in many respects, they share a basic orientation: All reject the views, so powerfully promoted by Freud, that psychological disorders

stem from repressed urges and hidden conflicts and that a therapist's key task is to force unwilling patients to gain insight into these conflicts. Further, all assume that human beings have the capacity to reflect on their own problems, to control their own behavior, and to make choices that will lead them toward more satisfying, fulfilling lives. And finally, all suggest that gaps in our self-concepts—flaws in our understandings of ourselves, our feelings, and our experiences—lie at the heart of much psychological distress.

Humanistic therapies have been criticized for their lack of a unified theoretical base and for being vague about precisely what is supposed to happen between clients and therapists. They have, however, helped to alter the dismal picture of human nature painted by Freud by calling attention to our capacities for growth and self-fulfillment. In addition, some of the central assumptions underlying humanistic approaches have been subjected to direct empirical test. For example, Rogers's view that the gap between an individual's self-image and his or her "ideal self" plays a crucial role in maladjustment has been investigated and often confirmed in many studies (e.g., Bootzin, Acocella, & Alloy, 1993). Also, research findings tend to confirm that therapists' personal warmth and ability to express empathy are predictive of their success, as suggested by Rogers's theory (e.g., Beutler, Crago, & Arizmendi, 1986). In these respects, then, humanistic therapies have made important and lasting contributions.

KEY POINTS

- Humanistic therapies assume that psychological disorders stem from interference by the environment with personal growth.
- Rogers's client-centered therapy focuses on eliminating unrealistic conditions of worth in a therapeutic environment of unconditional positive regard.
- Gestalt therapy focuses on helping clients acknowledge disowned parts of their own personalities and feelings.
- Humanistic approaches have been criticized for being vague, but several of their concepts have been validated in ongoing research.

BEHAVIOR THERAPIES: Psychological Disorders and Faulty Learning

While psychodynamic and humanistic therapies differ in many important ways, they both place considerable emphasis on early events in clients' lives as a key source of current disturbances. In contrast, another major group of therapies, known collectively as **behavior therapies**, focus primarily on individuals' current behavior. These therapies are based on the belief that many psychological disorders stem from faulty learning. Either the persons involved have failed to acquire the skills and behaviors they need for coping with the problems of daily life, or they have acquired *maladaptive* habits and reactions—ones that cause them considerable distress. Within this context, the key task for therapy is to change current behavior: to provide clients with the skills they need or to alter learned patterns of behavior that are causing them distress. In addition, behavior therapy often seeks to provide individuals with behaviors and strategies they can use to overcome their problems when they are not in the presence of the therapist—through guided *self-care* (Marks, 1994). Self-care is obviously important in the treatment of many medical conditions—for example, persons with some forms of diabetes must inject themselves with insulin every day or face the real threat of death. Similarly, many behavior therapists believe that persons with psychological disorders must practice the skills they acquire during therapy in appropriate situations; this, too, constitutes a kind of self-care and can play a major role in overcoming many psychological disorders.

Behavior Therapies: *Forms of psychotherapy that focus on changing maladaptive patterns of behavior through the use of basic principles of learning.*

What kinds of learning play a role in behavior therapy? As we saw in chapter 5, there are several forms of learning. Reflecting this fact, various forms of behavior therapy focus on specific types of faulty learning involving these basic processes.

THERAPIES BASED ON CLASSICAL CONDITIONING As you may recall from chapter 5, *classical conditioning* is a process in which organisms learn that the occurrence of one stimulus will soon be followed by the occurrence of another. As a result, reactions that are at first elicited only by the second stimulus gradually come to be evoked by the first as well (one example: your salivation to the beep of a microwave oven into which you've placed a container of popcorn). What does classical conditioning have to do with psychological disorders? According to behavior therapists, quite a bit (Bandura, 1969). Behavior therapists suggest, for example, that many *phobias* may be acquired in this manner. Stimuli associated with real dangers may acquire the capacity to evoke the intense fear reactions that at first were elicited only by the actual dangers. As a result, individuals experience intense fears in situations that really pose no threat to their well-being. In order to reduce such fears, behavior therapists sometimes employ the technique known as *flooding* (refer to chapter 5). This involves prolonged exposure to the feared stimuli, or to mental representations of them, under conditions where the persons suffering from the phobias can't avoid these stimuli. Under these conditions, *extinction* of fear can occur, and the phobias fade away (Levis, 1985).

Another technique based at least in part on principles of classical conditioning is known as **systematic desensitization**. In systematic desensitization, which is also used to treat various phobias, individuals first learn to how to induce a relaxed state in their own bodies—often by learning how to relax their muscles. Then, while in a relaxed state, they are exposed to stimuli that elicit anxiety. Since they are now experiencing relaxation, the conditioned link between these stimuli and anxiety is weakened, and extinction of anxiety reactions can occur.

A third behavioral technique based on principles of classical conditioning is known as *aversion therapy* (Lovaas, 1977). Here, stimuli that have previously been associated with positive feelings, and so are conditioned stimuli for them, are associated instead with negative feelings. For example, consider the case of a man who is sexually aroused by young children and finds it difficult to resist making advances to them. How can such a person be helped—assuming that he *wants* to change? One possibility is as follows. The therapist shows the man color slides of attractive children, precisely the kind that he finds arousing. A few seconds after each slide appears, the man receives a harmless but painful electric shock. As the process continues, the man's emotional reactions to these stimuli change. Initially his feelings are positive; but as the slides of the children are paired over and over again with shocks, his feelings begin to take on a distinctly negative tone. After all, the slides are now signals for the occurrence of a very unpleasant event.

If such treatment is successful, as it has been in several studies (Bucher & Lovaas, 1968), the man may find that he is no longer sexually excited by children and can seek more appropriate sexual partners. Many psychologists find delivering unpleasant stimuli to their clients unacceptable, however, and so an alternative procedure known as *covert desensitization* has gained increasing use. In this procedure, clients are merely asked to imagine aversive stimuli; they never actually receive them. Yet research with this technique suggests that it can often prove highly effective (e.g., Cautela, 1985).

SYSTEMATIC DESENSITIZATION: USING THE PRINCIPLES OF CLASSICAL CONDITIONING

After learning how to induce relaxation, this client, who has a fear of airplanes, is gradually exposed to stimuli that make her anxious.

Systematic Desensitization: *A form of behavior therapy in which individuals imagine scenes or events that are increasingly anxiety-provoking and at the same time engage in procedures that induce feelings of relaxation.*

THERAPIES BASED ON OPERANT CONDITIONING Behavior is often shaped by the consequences it produces; actions are repeated if they yield positive outcomes or if they permit individuals to avoid or escape from negative ones. In contrast, actions that lead to negative results are suppressed. These basic principles are incorporated in several forms of therapy based on *operant conditioning*. These differ considerably in specific procedures, but all incorporate the

following basic steps: (1) clear identification of undesirable or maladaptive behaviors currently shown by individuals; (2) identification of events that reinforce and so maintain such responses; (3) efforts to change the environment so that these maladaptive behaviors no longer receive reinforcement.

Several techniques incorporate these principles. One of these is based on the principle of *shaping* discussed in chapter 5. This involves helping individuals to acquire desired responses not currently in their repertoire by offering them reinforcement for responses that more and more closely resemble the desired ones. A clear illustration of this procedure is provided by the following actual case:

> A three-year-old . . . boy lacked normal verbal and social behavior. He did not eat properly, engaged in self-destructive behavior such as banging his head and scratching his face, and manifested ungovernable tantrums. He had recently had a cataract operation, and required glasses. . . . He refused to wear his glasses and broke pair after pair. The technique of shaping was decided upon to counteract the problem of glasses. Initially, the boy was trained to expect a bit of candy or fruit at the sound of a toy noisemaker. Then training was begun with empty eyeglass frames. First the boy was reinforced with candy or fruit for picking them up, then for holding them, then for carrying them around, then for bringing the frames closer to the eyes, and then for putting the empty frames on his head. . . . Through successive approximation, the boy . . . learned to wear his glasses up to twelve hours a day (Wolf, Risley, & Mees, 1964).

MODELING: CHANGING BEHAVIOR THROUGH OBSERVING OTHERS

Seeing other people act in fearless ways can often help individuals overcome phobias.

Token Economies: *Forms of behavior therapy based on operant conditioning, in which hospitalized patients earn tokens they can exchange for valued rewards when they behave in ways the hospital staff consider to be desirable.*

Operant principles have also been used in hospital settings, where a large degree of control over patients' reinforcements is possible (Kazdin, 1982). Several projects have involved the establishment of **token economies**—systems under which patients earn tokens they can exchange for various rewards, such as television-watching privileges, candy, or trips to town. These tokens are awarded for various forms of adaptive behavior that will help a patient function effectively after leaving the hospital. Thus, keeping one's room neat, participating in group meetings or therapy sessions, coming to meals on time, and eating neatly all yield tokens. The results of such programs have been impressive. When individuals learn that they can acquire various rewards by behaving in certain adaptive ways, they often do so, with important benefits to them as well as to hospital staff (Paul, 1982; Paul & Lentz, 1977).

Another technique based on principles of operant conditioning involves decreasing the probability of an undesirable response by increasing the likelihood of another response that is *incompatible* with it. For example, persons suffering from insomnia can learn various techniques for inducing relaxation, a state incompatible with feeling tense and wide awake; this can help them to get to sleep (e.g., Borkovec, 1982). Similarly, persons trying to quit smoking can learn to pop a piece of gum into their mouths whenever the craving for a cigarette arises. Since gum chewing is clearly incompatible with smoking, this response may help them avoid slipping back into smoking unintentionally—the kind of *absent-minded transgression* we considered in chapter 4.

MODELING: BENEFITING FROM EXPOSURE TO OTHERS Chapter 5 explained how we sometimes acquire new forms of behavior through observational learning—observing the actions and outcomes of others (Bandura, 1977, 1986). This is not the only way in which we are affected by exposure to others' behavior, however. Seeing other persons act in various ways can weaken or strengthen our tendencies to perform actions already at our disposal. For example, a motorist driving at 55 miles per hour in a 55-mph zone may soon

speed up to 65 if she notices that everyone else is passing her. In this case, her restraints against engaging in a prohibited behavior are weakened when she sees others break the prohibition. Conversely, a student talking to a friend in class may quickly fall silent if he notices that everyone else is quiet and listening carefully to the instructor. In this case, restraints are strengthened by exposure to the actions of others. Even emotional reactions can be intensified or reduced when we observe outward signs of emotion—or their absence—in others (Izard, 1992). The process through which exposure to others affects our behavior is known as *modeling*, and the effects it produces are varied and far-ranging in scope.

A substantial body of evidence indicates that modeling principles can be used effectively in treating several different psychological disorders. Modeling has been used to change a wide range of maladaptive behaviors, ranging from sexual dysfunctions (Kelley & Byrne, 1992) through the inability to control one's temper (Bandura, 1986). Perhaps the most impressive application of modeling, however, has been in efforts to alleviate various phobias (Bandura, Adams, & Beyer, 1977; Bandura, 1986). Many carefully conducted studies indicate that individuals who experience intense fear of relatively harmless objects can be helped to overcome such fears through exposure to appropriate fearless social models (Bandura, Blanchard, & Ritter, 1969).

Modeling techniques have also been found to be very successful in modifying the behavior of highly aggressive children and adolescents (Schneider & Byrne, 1987). These youngsters often behave aggressively because they are lacking in basic social skills: They don't know how to ask for what they want in a nonaggressive manner, how to refuse a request without angering the requester, and so on. The results of many studies indicate that modeling can be used to teach such skills quickly and efficiently (Schneider, 1991). A dramatic illustration is provided by a study conducted recently by Bienert and Schneider (1993).

These researchers exposed highly aggressive sixth graders to social skills training aimed specifically at teaching them how to deal with feelings of anger, stay out of fights, and respond nonaggressively to teasing. The children watched videotapes in which models showed both effective and ineffective actions, and also read passages in which other children coped successfully or unsuccessfully with problem situations. After only ten one-hour sessions, participants showed significantly lower levels of aggression and significant improvements in the ratings they received from peers and teachers. In contrast, a control group of highly aggressive children who were *not* exposed to the modeling procedures showed no improvements in these respects. Further, the benefits of the modeling procedures were still visible one year later when the children moved to junior high schools. Findings such as these indicate that modeling can be effective in helping individuals deal with a wide range of psychological problems.

INADEQUATE SOCIAL SKILLS: ONE CAUSE OF AGGRESSION

Highly aggressive children are often lacking in basic social skills. When they learn appropriate social skills through modeling therapy, their tendency to behave aggressively toward others often decreases.

KEY POINTS

- Behavior therapies assume that psychological disorders stem from faulty learning.
- Behavior therapies may be based on principles of classical conditioning, operant conditioning, or modeling.
- Behavior therapies based on operant conditioning attempt to help individuals develop adaptive behaviors by offering positive reinforcement for these actions or through the acquisition of responses incompatible with undesirable behaviors.

COGNITIVE THERAPIES: Changing Disordered Thought

A central theme in modern psychology—one I've emphasized at several points in this book—is this: Cognitive processes exert powerful effects on emotions and behavior. In other words, what we *think* strongly affects how we *feel* and what we *do*. This principle forms the foundation for another major approach to psychotherapy: **cognitive therapy**. The basic idea behind cogni-

***Cognitive Therapy:** Psychotherapy that concentrates on altering faulty or distorted modes of thought so as to alleviate psychological disorders.*

tive therapy is that many psychological disorders stem from faulty or distorted modes of thought. Change these, it is reasoned, and the disorders, too, can be alleviated. We'll now consider several popular forms of such therapy.

Rational-Emotive Therapy: Overcoming Irrational Beliefs Examine the list of beliefs or assumptions below:

> Everyone who meets me should like me.
>
> I should be perfect (or darn near perfect) at everything I do.
>
> Because something once affected my life, it will always affect it.
>
> It is unbearable and horrible when things are not the way I would like them to be.
>
> It is impossible to control my emotions, and I can't help feeling the way I do about certain things.

Be honest: Do such assumptions ever underlie your own thinking? You may strongly protest that they do not, but Albert Ellis (1987), originator of one influential form of cognitive therapy, believes that thoughts like these are extremely common. Having been through psychotherapy myself, I realize that such assumptions have certainly influenced my own thinking—especially the first two listed above. I really *did* want to be liked by everyone—including all the students in my classes. And I *did* believe, implicitly, that I had to be perfect (or darn near perfect, anyway).

Ellis contends that such *irrational thoughts* lie behind many psychological disorders. He suggests that there are compelling reasons for having such thoughts. Most persons, he reasons, have strong desires for success, love, and a safe, comfortable existence. Life, however, often fails to gratify these desires. Irrational thinking, then, is a harmful but understandable reaction to the unavoidable disappointments and frustrations of life.

Ellis asserts that while such irrational beliefs take many different forms, most center on the tendency to escalate reasonable desires into "musts," as in "I *must* be loved by everyone" or "I *must* experience continuous success to be happy." Closely linked to such ideas are tendencies Ellis describes as *awfulizing* or *catastrophizing*—beliefs that if a certain event occurs or fails to occur, it will be a calamity of unbearable proportions from which one can never hope to recover. Here are two examples: "If I don't get that promotion, *my career will be completely over*." "If I can't get into that course, *my semester will be totally ruined*."

Ellis maintains that people are often their own worst enemies. They cause their own disturbances by worrying about their inability to reach impossible goals and by convincing themselves that they simply cannot tolerate the normal frustrations and disappointments of life. To make matters worse, once such thoughts take hold, negative feelings and maladaptive behaviors soon follow; as Ellis puts it, irrational ideas create disruptive feelings and behavior, which then serve to sustain and even intensify the irrational beliefs (see Figure 15.3).

How can this self-defeating cycle be broken? Ellis suggests that the answer involves forcing disturbed individuals to recognize the irrationality of their views. **Rational-emotive therapy (RET)** is designed to accomplish this task. During this procedure the therapist first attempts to identify irrational thoughts and then tries to persuades clients to recognize them for what they are—badly distorted views of reality. For example, imagine that a therapist practicing RET is confronted with a client who says, "I just had an important article rejected for publication. It's so depressing. All that work down the tubes. I *can't stand it* when that happens!" The therapist might reply, "So you had an article rejected. Doesn't that happen to other people too? Why do you think your colleagues have to love everything you do, or that you have to be perfect?" Actually, my therapist said many things like this to me during my

Rational-Emotive Therapy: *A cognitive therapy that focuses on changing irrational beliefs.*

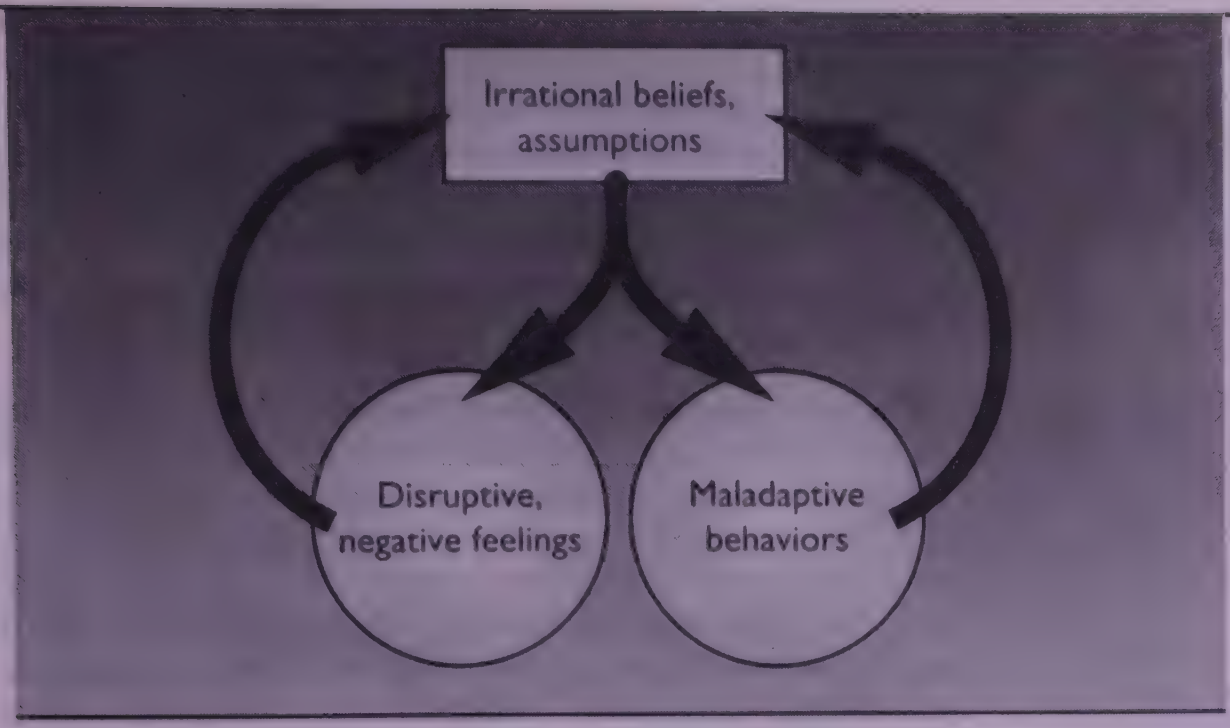


FIGURE 15.3

Rational-Emotive Therapy

According to Ellis, many psychological disorders stem from irrational thoughts. These create disruptive feelings and maladaptive behaviors, which in turn sometimes trap people in a vicious circle. Rational-emotive therapy seeks to break this cycle.

own rational-emotive therapy; his comments helped me recognize the irrational assumptions that were interfering with my adjustment.

BECK'S COGNITIVE BEHAVIOR THERAPY FOR DEPRESSION The discussion of depression in chapter 14 noted that this common and serious psychological disorder has an important cognitive component: It stems, at least in part, from distorted and often self-defeating modes of thought. Recognizing this important fact, Beck and his colleagues (Beck, 1985) have devised a **cognitive behavior therapy** for alleviating this problem. Like Ellis, Beck assumes that depressed individuals' problems result from illogical thinking about themselves, the external world, and the future. Moreover, he contends, these illogical ideas and tendencies are often maintained in the face of evidence that contradicts them. In an important sense, then, they are both self-defeating and self-fulfilling. What are the cognitive tendencies that foster depression? Among the most important are these:

1. A tendency to overgeneralize on the basis of limited information—for example, to see oneself as totally worthless because of one or a few setbacks.
2. A tendency to explain away any positive occurrences by interpreting them as exceptions to the general rule of failure and incompetence.
3. A tendency toward selective perception—especially, perception of the world as a dangerous, threatening place.
4. A tendency to magnify the importance of undesirable events—to perceive them as the end of the world and unchangeable.
5. A tendency to engage in absolutistic, all-or-none thinking—for example, to interpret a mild rejection as final proof of one's undesirability.

How can such tendencies be altered? In contrast to rational-emotive therapy, Beck's cognitive behavior therapy does not attempt to disprove them. Rather, the therapist and client work together to identify the individual's assumptions, beliefs, and expectations and to formulate ways of testing them. For example, if a client voices the belief that she is a total failure, the therapist may suggest that this assumption should be evaluated. Together, the client and therapist then determine ways to test the assumption's accuracy. These tests are designed to provide the client with success experiences, thereby refuting her negative views, helping her toward enhanced self-esteem, and alleviating her depression.

Cognitive Behavior Therapy: *A form of psychotherapy designed to overcome depression by changing self-defeating patterns of thought.*

Considerable evidence suggests that these procedures are highly effective in overcoming depression and helping depressed persons return to healthy, active lives (Clark, Beck, & Brown, 1989; Robinson, Berman, & Neimeyer, 1990). So there seems to be a grain of truth to the old belief that the problems experienced by many depressed persons are "all in their minds." Depression often *does* seem to stem from maladaptive patterns of thought, and for this reason forms of therapy focused on changing these aspects of cognition can often prove highly effective.

Constructivist Cognitive Therapy: Bringing Emotions into the Picture

Both forms of cognitive therapy we have considered so far emphasize changing irrational and illogical thoughts. But this emphasis has been challenged by psychologists such as Mahoney (1991) who feel that these approaches do not take sufficient account of emotion. A newer procedure known as **constructivist cognitive therapy** (Mahoney, 1991) takes account of such concerns. This form of therapy suggests that people continually construct their personal worlds through their actions and the feedback they receive. This personal construction of reality may be badly distorted as a result of thought patterns acquired early in life and the strong emotions associated with these thoughts. To counter such distortions, Mahoney and others use techniques such as asking clients to write stories or letters they won't mail or to observe themselves while sitting in front of a mirror. Presumably, these actions help the client understand his or her unique way of viewing the world and the emotional and cognitive outcomes this produces. Constructivist cognitive therapy is still fairly new, so there is relatively little evidence concerning its effectiveness. However, some psychologists report considerable success in using this technique to change distorted patterns of thought and associated emotions (Mahoney, 1991).

Key Points

- Cognitive therapies assume that psychological disorders stem from irrational thoughts. Rational emotive therapy focuses on inducing individuals to recognize and reject irrational thoughts and assumptions.
- Cognitive behavior therapy for depression seeks to eliminate irrational and self-defeating modes of thought.
- Constructivist cognitive therapy focuses on countering inaccurate perceptions by helping individuals understand their own unique ways of looking at the world.

Group Therapies: Working with Others to Solve Personal Problems

Constructivist Cognitive Therapy: An approach to psychotherapy that seeks to help individuals understand their own unique views of the world, and to change irrational aspects of these views.

Group Therapies: Therapies conducted with groups of clients.

Psychodrama: A form of psychodynamic group therapy in which people act out their problems in front of fellow group members.

All of the therapies we have considered so far are conducted on a one-on-one basis: One therapist works with one client. As you may already know, however, this is not the only approach to helping individuals deal with psychological problems. In recent decades, **group therapies**, in which treatment takes place in groups, have grown tremendously in popularity. We'll now examine several important types of group therapy, beginning with types that are closely linked to the individual therapies we considered earlier.

Psychodynamic Group Therapies

Techniques developed by Freud for individual therapy have also been modified for use in group settings. Perhaps the most popular form of psychodynamic group therapy is **psychodrama**—a form of therapy in which group members act out their problems in front of other group members, often on an actual stage. Psychodrama also involves such techniques as *role reversal*, in which group members switch parts, and *mirroring*, in which they portray one

another on the stage. In each case the goal is to show clients how they actually behave and to help them understand *why* they behave that way—what hidden inner conflicts lie behind their overt actions (Olsson, 1989). While psychodrama is highly appealing to many persons, it is subject to the same criticisms as all psychodynamic therapies, so its potential benefits may be somewhat overstated by its often ardent supporters.

Behavioral Group Therapies

In contrast, there is very compelling evidence for the effectiveness of *behavioral group therapies*—group approaches in which basic principles of learning are applied to solving specific behavioral problems. Such therapy has been found to be especially successful in teaching individuals basic *social skills* and in helping them learn how to stand up for their own rights—*assertiveness training*. In assertiveness training, for example, individuals practice such skills as expressing their feelings: verbally communicating their reactions to others, demonstrating their emotions nonverbally, expressing disagreement with others, and accepting praise by agreeing with it. By practicing these skills with and in front of other group members, people can often achieve major gains quite rapidly. In many cases the therapist first models the appropriate behavior and then provides group members with opportunities to practice these actions. During therapy sessions individuals also learn that no catastrophe will follow if they don't do it "right"—other members and the therapist are there to help them, not to damage their egos. This, too, is an important advantage.

Humanistic Group Therapies

Psychologists who practice humanistic therapies have been by far the most enthusiastic about the potential benefits of adapting their therapeutic techniques to group settings. Indeed, interest in group therapy originated among humanistic therapists, who developed two forms of such therapy—**encounter groups** and **sensitivity-training groups**. Both of these techniques focus on the goals of personal growth, increased understanding of one's own behavior, and increased openness and honesty in personal relations. In both, group members are encouraged to talk about the problems they encounter in their lives. The reactions they receive from other group members are then crucial in helping them understand their own responses to these problems. The major difference between encounter groups and sensitivity-training groups lies in the fact that encounter groups carry the goal of open exchange of views to a greater extreme: Members in these groups are encouraged to yell, cry, touch each other, and generally act completely uninhibited. In contrast, sensitivity-training groups are somewhat more subdued.

Humanistic group therapies use several ingenious warming-up exercises to get the process of open exchange of views started. In one, for example, participants are blindfolded and wander around the room communicating only by touch. These procedures are designed to help members realize that normal restraints and rules don't operate in the group setting: that they are free to say and do almost anything—and so to come face to face with their own distorted self-concepts and perceptions.

Do such groups actually produce beneficial changes? Many persons who have participated in them attest that they do, but most research on this issue has been relatively informal in nature, so it is hard to reach firm conclusions (Kaplan, 1982). In any case, literally millions of people have participated in such groups; their sheer popularity may indicate that they are meeting a real need of some kind.

Encounter Groups: *A form of group therapy in which people are urged to tell other group members exactly how they feel; designed to foster personal growth through increased understanding of one's own behavior and increased honesty and openness in personal relations.*

Sensitivity-Training Groups: *A form of group therapy designed to foster personal growth through increased understanding of one's own behavior and increased honesty and openness in personal relations.*

SELF-HELP GROUPS: SUPPORTING ONE ANOTHER

Members of self-help groups meet to discuss shared problems and find ways of coping with them.

SELF-HELP GROUPS: Help from Our Peers

When we are anxious, upset, or otherwise troubled, we often seek comfort and support from others. Long before there were psychologists or psychiatrists, people sought informal help with their personal difficulties from family, friends, or clergy. This natural tendency has taken a new form in **self-help groups** (Christensen & Jacobson, 1994). These are groups of persons who are experiencing the same kinds of problems and meet to help each other in their efforts to cope with their difficulties. Self-help groups are a fact of life in the 1990s; indeed, it has been estimated that at any given time, almost 4 percent of all American adults are involved in such groups (Jacobs & Goodman, 1989). What kinds of problems do these groups address? Almost everything you can imagine—and then some. Self-help groups have been formed to help their members cope with alcoholism (Alcoholics Anonymous is perhaps the most famous of all self-help groups), the death of a spouse, rape, AIDS, childhood sexual abuse, being a single parent, divorce, stuttering, abusive spouses, breast cancer—the list is almost endless.

A guiding principle behind these groups is that people who share a problem have a unique understanding of it and can offer one another a level of empathy that those who have not experienced the problem—no matter how concerned—can provide. Do self-help groups succeed? Few scientific studies of the impact of such groups have yet been conducted, but there is some indication that they can yield important benefits (Christensen & Jacobson, 1994; Stuart, 1977). In any case, these groups do provide their members with emotional support and help them to make new friends. Given the frequency with which many people relocate, this in itself can be beneficial.

Self-Help Groups: *Groups of individuals experiencing the same kinds of difficulties that meet to discuss their shared problems and find solutions.*

Can people help solve their own psychological problems through the use of self-help audiotapes? For information on this topic, please see the **Research Process** section below.

THE RESEARCH PROCESS

Subliminal Self-Help Audiotapes: Do They Deliver What They Promise?

Self-help—efforts by individuals to cope with their own problems, psychological or otherwise, is big business in the 1990s. Visit any large bookstore and you will see shelves overflowing with books promising to help purchasers improve their personalities, their mental capacity, their energy level, and even their love life. And right next to these books, in many cases, is a large array of audiotapes designed to accomplish similar self-help purposes. Perhaps the most intriguing—and controversial—of these tapes are ones that incorporate *subliminal messages* as a means of inducing desired changes. Such messages are presented so briefly or at such low volume that listeners cannot report that they have heard them; in other words, they are below the sensory threshold for conscious awareness (see chapter 3). Yet the tapes claim, presumably because people process these subliminal messages at some level, that the messages can produce important changes in behavior.

Are such claims valid? Or are subliminal self-help tapes a waste of time and money? I touched on this question in chapter 3, but here let's examine it in more detail. First, as noted in that earlier discussion, some research findings indicate that stimuli that are below the threshold for conscious awareness—ones we can't report having seen or heard—can sometimes influ-

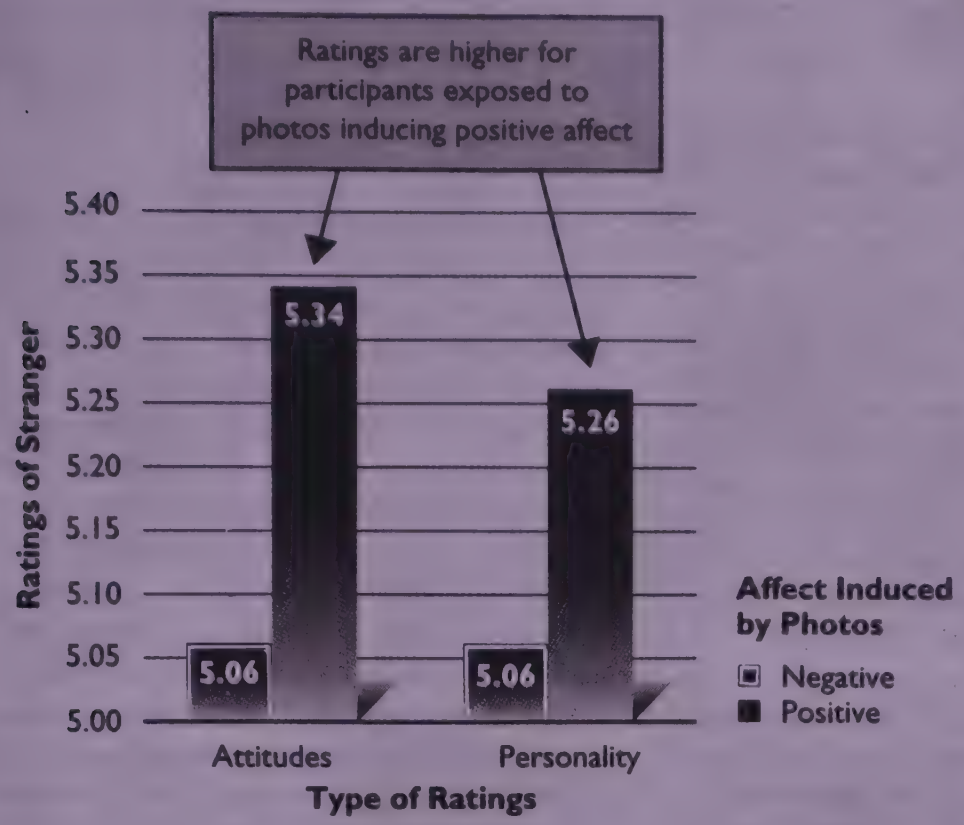


FIGURE 15.4

Evidence for the Effects of Subliminal Stimuli on Attitudes

Participants were exposed briefly to affect-inducing photos. Then they saw scenes of a stranger engaged in routine activities such as shopping in a grocery store and sitting in a restaurant. Although the affect-inducing photos were shown so briefly that participants could not report their contents, these photos influenced their ratings of the stranger. Those who saw photos that induced positive affect rated her higher than those who saw photos that induced negative affect. (*Source:* Based on data from Krosnick et al., 1992.)

ence our behavior (e.g., Niedenthal, 1990). Recent and convincing evidence for this conclusion is provided by a series of carefully conducted investigations by Krosnick and his colleagues (Betz & Krosnick, 1993; Krosnick et al., 1992).

These studies were designed to examine the possible effects of subliminal stimuli on attitudes, and results indicate that such effects do seem to occur. In one study, for example, college students saw photos of a stranger engaged in routine daily activities: walking into her apartment, shopping in a grocery store, sitting in a restaurant. Each photo was shown for two seconds. Immediately before these photos were presented, participants in two groups were also exposed to photos previously shown to produce either positive feelings (such as photos of people playing cards and laughing) or negative feelings (such as photos of open-heart surgery). These affect-inducing photos were shown so briefly (for less than 0.10 second) that participants could not even tell whether they were words or photos. Thus, the stimuli were presented *subliminally*—below the threshold for conscious awareness of their contents. After viewing these stimuli, participants were asked to indicate their attitudes toward the stranger shown in the photos and to rate her on a variety of trait dimensions (unfriendly–friendly, cruel–kind, and so on). Questioning of participants indicated that they could not guess the purpose of the study; yet their attitudes *were* influenced by the affect-inducing slides. Participants exposed to the positive affect–inducing scenes reported more positive attitudes and rated the target person higher on trait dimensions than those exposed to the negative affect–inducing scenes (see Figure 15.4).

Subliminal Stimuli and Self-Help Tapes

The finding that subliminal stimuli can sometimes influence attitudes is interesting, but it does not necessarily mean that self-help tapes containing subliminal messages are effective in producing their stated goals. Is there any direct evidence on this issue? As I noted in chapter 3, there is. A very careful study conducted by Greenwald and his colleagues (1991) tested the effectiveness of self-help audiotapes in a rigorous *double-blind* experimental design. In double-blind designs, neither the experimenter nor the participants have any knowledge of the condition to which participants have been assigned. Thus, the potential role of *demand characteristics* and other factors that can generate spurious results is greatly reduced. Let's take a closer look at this study.

In it, hundreds of volunteers were given self-help tapes purported either to improve their memory or to enhance their self-esteem. When played, these tapes seemed to contain only music or recorded nature sounds, but in fact they also presented subliminal messages designed to improve memory or boost self-esteem. Measures of participants' memory and self-esteem were collected twice: before they received the tapes and again after they had listened to them for one month. Some of the tapes were labeled accurately: Participants who received them knew they were receiving tapes that were supposed to enhance their

memory or their self-esteem. Other tapes, however, were cross-labeled: Self-esteem tapes were labeled "Memory Improvement" and memory tapes were labeled "Self-Esteem Enhancement."

If the tapes were actually capable of accomplishing their stated purposes, then these effects should have occurred regardless of the label. For example, persons receiving the memory tapes should have showed higher memory scores than those receiving the self-esteem tapes, *regardless of the labels on the tapes.* But results failed to confirm these predictions. Self-esteem increased for persons told they had received self-esteem tapes, and memory increased for persons told they had received memory-improving tapes, regardless of the actual tape content. So the only result was a general *placebo effect*: Merely being in the study and *expecting* positive effects to occur increased participants' motivation and hence their performance.

In sum, there is no firm evidence for any beneficial effects of subliminal self-help tapes. While some findings do suggest that subliminal stimuli can influence our behavior in subtle ways, these effects aren't strong enough—at least in the subliminal tapes now available—to change important aspects of behavior. My recommendation? Save your money!

Critical Thinking Questions

1. Krosnick and his colleagues suggest that participants in studies of subliminal stimuli could not guess the purpose of the research, so demand characteristics did not influence the results. Do you think it's possible that participants really did figure out the purpose of the studies but were reluctant to admit this to the researchers? If so, how could this have affected the results?
2. Participants in the research by Krosnick and his colleagues (1992) could not recognize the positive and negative photos they saw; yet these influenced their attitudes toward a stranger. How could such effects occur? What mechanisms could possibly produce such results?
3. Suppose that subliminal self-help tapes had no labels at all. What would occur? Why?
4. What if tapes were labeled as containing subliminal self-help messages but actually contained none? Would the same findings as reported above be obtained? If so, why? If not, why?

Key Points

- Psychodynamic group therapies such as psychodrama are designed to help individuals bring inner conflicts to the surface.
- Behavioral group therapies focus on changing specific aspects of behavior, such as assertiveness or social skills.
- Humanistic group therapies focus on enhancing personal growth and improving self-knowledge.
- Self-help groups consist of individuals who share a problem and who meet to help each other in their efforts to cope with this problem.
- There is evidence that subliminal stimuli can effect our moods and our attitudes, but careful tests provide no support for the effectiveness of subliminal self-help tapes.

Therapies Focused on Interpersonal Relations: Marital and Family Therapy

The therapies we have considered so far differ greatly in many respects, yet in one sense they are all related: They search for the roots of psychological disorders in processes operating within individuals. Another group of therapies adopts a sharply different perspective. According to practitioners of this *interpersonal* approach, disturbed or maladaptive interpersonal relationships lie at the heart of many psychological disorders (Gurman, Kniskern, & Pinsof, 1986). In other words, individuals experience personal difficulties because their relations with others are ineffective, unsatisfying—or worse. Several forms of therapy based on this idea are described below.

Marital Therapy: When Spouses Become the Intimate Enemy

In the United States more than 50 percent of all marriages now end in divorce, and several million Americans have

been married three or more times (Brody, Neubaum, & Forehand, 1988). Keeping people who are poorly matched in joyless marriages is certainly not a useful goal or one likely to promote favorable psychological adjustment. However, growing evidence indicates that in many cases the downward spiral that characterizes failing marriages can be stopped, and even reversed, if intervention occurs early enough in the process (Hendrick, 1989). Then the pain to both spouses and children can be reduced. What are the goals of such **marital therapy**, or *couple therapy*? These are closely linked to the factors that tend to disrupt such intimate relationships.

First, it appears that many couples get into serious difficulties largely because of a lack of appropriate *communication skills*. Happy couples, married or otherwise, tend to keep the channels of communication open. They talk to each other more often and more easily, sharing feelings, concerns, goals, and plans. They provide each other with more positive, and less negative, feedback than do unhappy couples (Lauer & Lauer, 1985). They have more problem-solving sessions in which they discuss how to deal with difficulties in their relationships and get along better (Margolin & Wampold, 1981). An important task for couple therapy, then, is improving the communication skills of both partners. The therapist works to foster such improvements in many different ways, including having each partner play the role of the other person so as to see their relationship as the other does, and having couples watch videotapes of their interactions. The latter procedure often leads to remarkable insights into just how poorly the couple has been communicating.

A second problem demonstrated by poorly adjusted couples involves *attributions*—explanations each partner offers for the other's behavior. Unhappy couples tend to explain each other's behavior in unflattering terms (Brehm, 1992; Holtzworth-Munroe & Jacobson, 1985). For example, they explain negative actions by their spouse, such as coming home late or failing to do agreed-upon chores, as stemming from *internal* causes such as stable traits: "She's irresponsible," or "He's just lazy." In contrast, happy couples, faced with the same behaviors give the partner an out, assuming that some external factor beyond her or his control is to blame: "She must have missed the train," or "He's been so busy, he couldn't get to the chores." Couple therapy, therefore, is often directed toward the goals of helping both partners to recognize and change these destructive attributional patterns.

In sum, various forms of couple therapy focus on the task of arming couples with basic social skills they need to live together in a more harmonious manner. As a result of such training, couples' interpersonal relations can improve dramatically, and the overall adjustment—and happiness—of both partners may be substantially improved.

Family Therapy: Changing Environments That Harm

Let's begin with a disturbing fact: When individuals who have been hospitalized for the treatment of serious psychological disorders and who have shown marked improvements finally return home, they often experience a relapse. All the gains they have made through individual therapy seem quickly to vanish (Carson, Butcher, & Coleman, 1988). This fact points to an unsettling possibility: Perhaps the problems experienced by such persons can be traced, at least in part, to their families—or more specifically, to disturbed patterns of interaction among family members (Hazelrigg, Cooper, & Borduin, 1987). To the extent this is true, attempting to help one member of a family makes little sense. Once he or she is back in the same disordered home environment, any

Marital Therapy: *Psychotherapy that attempts to improve relations and understanding in couples.*

FAMILY THERAPY

Family therapy is based on the view that many psychological disorders stem from disturbed interpersonal relations among family members.

benefits of therapy may be very short-lived. In one respect, returning such persons to their families is akin to throwing a person who has just been saved from drowning back into deep, icy waters (Goldenberg & Goldenberg, 1985).

Recognition of this important fact has spurred the development of several types of **family therapy**—therapies designed to change the relationships among family members in constructive ways. One type of family therapy is known as the *communications approach* (e.g., Selvini-Palazzoli et al., 1978). This approach focuses on the fact that family members often send each other contradictory messages: "I forgive you—but don't touch me!" or "I don't care if you win; just do your best—but don't expect any hugs if you lose!" The primary goal of the communications approach is helping members of the family to recognize such conflicted messages and change them.

Another type of family therapy is known as *structural family therapy*. Here, it is assumed that relations *between* family members are more important in producing psychological disorders than aspects of personality or other factors operating largely *within* individuals (Minuchin & Fishman, 1981). Careful analysis of patterns of interaction within families often reveals key causes of distress. In one common pattern, a mother and child form a close relationship or *subsystem* within the family that all but excludes the father. This, in turn, may strain the relationship between the two parents to the point where the child, sensing conflict, develops various symptoms, such as disruptive behavior at school or illness that has no apparent physical cause. Another frequent pattern is one in which hostility between the parents is reflected in rivalry between siblings, who take sides in each dispute and may, as a result, bear most of the distress produced.

How can such destructive patterns be changed? In structural family therapy, the therapist may interact with the family almost as an insider and so gain insight into repeated patterns occurring within it. Thus, the therapist tries to determine who dominates the power structure, who gets blamed when things go wrong, who usually tries to patch things up, and so forth. Then, armed with this information, the therapist employs a wide range of techniques to facilitate positive change. In many cases, this involves efforts to alter specific behaviors (Gurman, Kniskern, & Pinsof, 1986). In others, the therapist may use modeling procedures to demonstrate more effective means of interacting. And in still other cases, the therapist tries to induce family members to recognize distorted thinking about one another or unfavorable patterns of attributions (Duck & Barnes, 1992).

KEY POINTS

- Marital or couple therapy focuses on improving communication and changing faulty attributions within couples.
- Family therapy focuses on improving relations among family members by reducing contradictory communications and by altering family structure.

Research on family therapy indicates that in many cases it is quite successful. For example, after undergoing such therapy, family members are rated by therapists, teachers, and other observers as demonstrating more adaptive behavior and better relations with each other than was true before (Hazelrigg, Cooper, & Borduin, 1987). The stability of such changes remains to be determined (Wellisch & Trock, 1980), but family therapy does seem to offer a promising new approach to dealing with psychological disorders when these seem to stem from interactions among family members.

Family Therapy: *A form of psychotherapy that focuses on changing interactions or relations among family members.*

Please see the **Key Concept** page for an overview of the major forms of psychotherapy discussed in this section.

KEY CONCEPT

Major Forms of Psychotherapy

Therapy	Major Focus	Key Procedures
Psychoanalysis (Freudian)	Bringing repressed feelings and impulses into consciousness	Free association Dream interpretation Analysis of resistance
Humanistic Therapies (Client-Centered Therapy)	Eliminating unrealistic conditions of worth	Therapist's expression of unconditional positive regard for client
	Correcting distortions in self-concept	Therapist's empathy toward client and reflection of client's feelings and reactions
Behavior Therapies	Changing maladaptive patterns of behavior Overcoming/changing past faulty learning	Systematic desensitization Shaping of adaptive behavior through reinforcement Modeling
Cognitive Therapy	Changing faulty or distorted modes of thought Changing irrational beliefs and assumptions	Clarification of the irrational nature of client's beliefs Evaluation of self-defeating ideas and assumptions to demonstrate that they are false
Group Therapies	Inducing beneficial individual change or change in important interpersonal relations (e.g., family, couple) in context of group setting	Group activities, mutual empathy, and guidance to increase individuals' self-insight and help them to learn new social skills

Freud's office in Vienna

Systematic desensitization in process

A family therapy session

Psychotherapy: Some Current Issues

Psychotherapy has definitely arrived. While some people continue to view it with skepticism, ever-growing numbers of distressed individuals seek it out. Perhaps the magnitude of this shift is best illustrated by the following fact: In the 1950s only 1 percent of the U.S. population had ever had contact with a trained therapist; currently this figure is approaching 10 percent.

What accounts for this change? Part of the answer involves shifting attitudes toward the idea of participating in psychotherapy. Once, there was a stigma attached to this process. People spoke about it in hushed tones and did their best to conceal the fact that someone in their family—or they themselves—had received therapy. This was certainly true in my own family when my grandmother, suffering from deep depression, received prolonged medical care. I was ten years old at the time and knew quite well that something important was happening; but my parents refused to discuss it with me and brought the topic up only when they thought I was out of earshot—which wasn't always the case!

While negative attitudes about psychotherapy have not entirely vanished, they have certainly weakened considerably. As a result, growing numbers of people are now willing to seek assistance in dealing with psychological problems that threaten their happiness and adjustment. Another factor is the growing sophistication—and effectiveness—of psychotherapy itself. In recent decades many new forms of therapy have been introduced, and these are applicable to a wider range of disorders and a broader range of people than was true in the past. These trends, too, have contributed to the veritable boom in psychotherapy.

This is not to suggest, however, that important questions no longer exist. On the contrary, as psychotherapy has grown in popularity, such questions have become increasingly crucial and have received growing attention. Several of these issues are considered below.

Does Psychotherapy Really Work? An Optimistic Conclusion

In 1952 Hans Eysenck, a prominent psychologist, dropped a bombshell on his colleagues: He published a paper that reported data indicating that psychotherapy is ineffective. Specifically, Eysenck reported that about 67 percent of patients with a wide range of psychological disorders improve after therapy, but that *about the same proportion of persons receiving no treatment also improve*. This was a disturbing conclusion for psychologists and quickly led to a great deal of soul-searching—and research—within the field. After all, if the same proportion of people recover from psychological disorders with and without therapy, why bother?

Fortunately, the findings of subsequent studies pointed to a very different conclusion: Contrary to what Eysenck suggested, psychotherapy *is* helpful (Bergin & Lambert, 1978; Clum & Bowers, 1990; Shapiro & Shapiro, 1982). Apparently, Eysenck had overestimated the proportion of persons who recover spontaneously without any therapy. And he also *under*estimated the proportion who improve as a result of therapy. For example, in a major review of evidence on this issue, Smith, Glass, and Miller (1980) found that in almost five hundred separate studies, the average person receiving therapy showed fewer symptoms or difficulties than 80 percent of those who had not

yet received therapy (persons who were still on waiting lists for such help). These findings have been confirmed over and over again in more recent reviews conducted with increasingly sophisticated procedures such as meta-analysis (e.g., Elkin et al., 1989).

Additional support for the effectiveness of therapy is provided by studies indicating that the more treatment individuals receive, the greater the improvement they demonstrate. In other words, as therapy progresses, persons receiving it continue to improve and show fewer symptoms and less and less distress (Howard et al., 1986; Orlinsky & Howard, 1987).

Such effects are not limited to therapy conducted with adults. Recent reviews indicate that therapy is also successful with children and adolescents (e.g., Kazdin, 1993; Weisz et al., 1992). Again, these reviews indicate that youngsters receiving therapy show greater improvements than most who do not receive treatment. Indeed, the average young person receiving therapy tends to score better, on various measures of adjustment, than 70 to 80 percent of those not receiving therapy.

Finally, additional studies have compared the effectiveness of psychotherapy with drug therapy, which we'll consider in the next section. Results indicate that certain forms of psychotherapy are at least as effective as drug therapy and may be superior to it in some respects. For example, in a review of existing evidence concerning the relative benefits of cognitive therapy and drug therapy for depression, Hollon, Shelton, and Loosen (1991) found that these two forms of treatment were about equally effective in alleviating the symptoms of this disorder. However, cognitive therapy appeared to be superior to drug therapy in terms of rates of relapse—the proportion of persons who become depressed again after treatment has been completed. Fewer persons who received cognitive therapy showed relapse into depression than persons who received drug therapy, and cognitive therapy alone was about as effective in this respect as a combination of both drug and cognitive therapy (see Figure 15.5).

One note of caution: many of these findings are based on the results of carefully controlled studies in which participants voluntarily entered treatment, in which efforts were focused on dealing with specific problems, and in which therapists were trained in using certain techniques immediately before therapy was administered. As noted by Weisz, Weiss, and Donenberg (1992),

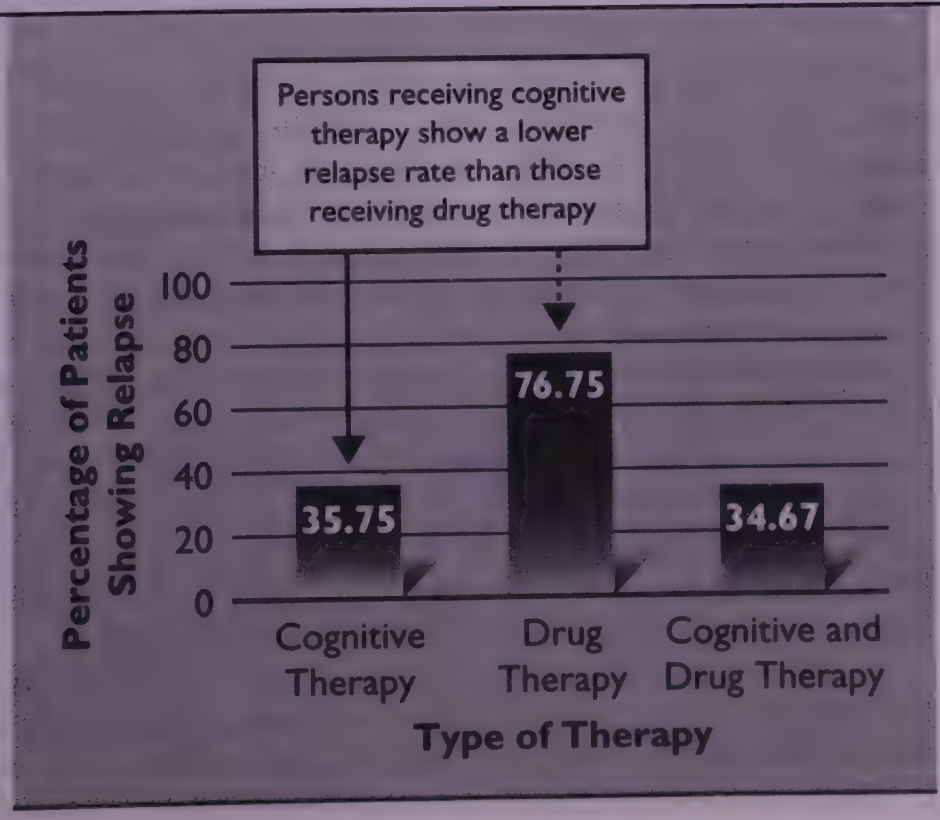


FIGURE 15.5

Cognitive Therapy and Drug Therapy: Which Is More Effective?

Cognitive therapy and drug therapy for depression seem to be about equally effective in alleviating the symptoms of this disorder. However, as shown here, cognitive therapy appears to be superior to drug therapy in terms of preventing future reappearance of depression. (*Source:* Based on data reported by Hollon, Shelton, & Loosen, 1991.)

these conditions tend to load the dice in favor of positive outcomes for the types of therapy studied, and it is not clear whether similar positive outcomes would be obtained under more normal clinical conditions. However, even in the face of such concerns, existing evidence seems to suggest that psychotherapy really does work. It is certainly not equally effective for all persons or for all disorders and does not necessarily totally eliminate various psychological problems (Robinson, Berman, & Neimeyer, 1990); but overall, it is considerably better than hoping that these problems will go away by themselves.

Are Some Forms of Therapy More Successful Than Others? Solving a Persistent Puzzle

The procedures used in various forms of therapy differ sharply. It seems only reasonable, then, to expect that some types of therapy will be more effective than others. But brace yourself for a surprise: Comparisons among therapies have generally yielded inconclusive results. Despite the contrasting procedures various forms of therapy employ, they all seem to yield roughly equivalent benefits (Hollon, DeRubeis & Evans, 1987; Hollon, Shelton, & Loosen, 1991; Kiesler, 1985; Luborsky, Singer, & Luborsky, 1975). How can therapies employing sharply different procedures yield similar results? Here are two possibilities.

Differences among Various Therapies Exist, but We Have to Search for Them in the Right Places First, it is possible that some forms of therapy *are* more effective than others, but only with respect to certain types of disorders. As Kiesler (1966) put it, in comparing various psychotherapies we should not ask, "Which is better?" Rather, we should inquire, "What type of treatment by what type of therapist is most effective in dealing with what specific problems among specific persons?" In short, it would be surprising if one type of psychotherapy was superior to others in all cases. It is much more likely that some types will prove to be more useful in dealing with certain types of psychological disorders and when administered by certain therapists. Many psychologists accept this view, although they realize that from a practical perspective, comparing the success of many types of therapy in overcoming a wide range of psychological disorders is a huge task (Stiles, Shapiro, & Elliott, 1986).

Various Types of Psychotherapy Yield Equivalent Benefits Because They Have a Common Core Another possibility is that while various forms of therapy do differ in rationale and procedures, these differences, from a practical point of view, are relatively unimportant. Under the surface, all share common, crucial features, and it is this shared core that accounts for their similar effectiveness. What is this common nucleus? It may consist of several key features.

First, all major forms of psychotherapy provide troubled individuals with a special type of setting—one in which they interact closely, usually one-on-one with a highly trained, empathetic, professional. For many clients this exposure to another person who seems to understand their problems and genuinely to care about them may be a unique experience or at least one they have rarely encountered. The experience is very reassuring and may play an important role in the benefits of many forms of therapy.

Second, every form of therapy provides individuals with an explanation for their problems. No longer do these seem to be mysterious and, perhaps, the result of hidden character flaws. Rather, as therapists explain, psychological disturbances stem from understandable causes, many of which lie outside

the individual. This is something of a revelation to many persons who have sought in vain for a clue as to the origins of their difficulties.

Third, all forms of therapy specify actions that individuals can take to cope more effectively with their problems. No longer must they merely suffer silently or wring their hands in despair. Rather, they are now actively involved in doing specific things that the confident, expert therapist indicates will help.

Fourth, as I mentioned at the start of this chapter, all forms of therapy involve clients in what has been termed the *therapeutic alliance*—a partnership in which powerful emotional bonds are forged between client and therapist, and in which both work to solve the client's problems.

Combining all of these points, the themes of *hope* and *personal control* seem to emerge very strongly. Perhaps diverse forms of therapy succeed because all provide people with increased hope about the future plus a sense of heightened personal control. At least individuals in therapy have taken their fate into their own hands and are doing something constructive about it. To the extent this is the case, it is readily apparent why therapies that seem so different on the surface can all be effective. All cast a bright, comforting light into the emotional darkness of troubled people and in this manner help bring about positive change.

While many forms of therapy appear to be effective, it is important to note that all were first developed for use with white, middle-class patients. Is psychotherapy effective for other, ethnically and culturally diverse groups, too? And if not, how must therapeutic methods be altered to encompass such diversity? For information on these and related issues, please see the **Perspectives on Diversity** section below.

Key Points

- Growing evidence indicates that psychotherapy is effective.
- Surprisingly, however, there is little evidence that one type of therapy is more effective than another. This may be so because all forms of therapy share certain crucial features.
- There is a pressing need for a multicultural perspective in psychotherapy.

Perspectives on Diversity

Psychotherapy: The Necessity for a Multicultural Perspective

In chapter 14, we saw that subtle forms of bias may play a role in the diagnosis of many psychological disorders. Individuals' race, sex, ethnic background, and social class all seem to influence the specific disorders attributed to them as well as judgments concerning the severity of such problems (Lopez, 1989). Thus, for example, blacks are more likely to be diagnosed as schizophrenic and less likely to be diagnosed as showing affective (mood) disorders than whites. Similar patterns occur for Hispanics, Native Americans, and individuals of Asian descent (Snowden & Cheung, 1990). While such findings may reflect actual differences in the underlying incidence of these disorders, growing evidence suggests that subtle—and usually unconscious—bias also plays a role (Lopez, 1989).

If racial and ethnic factors can influence the diagnosis of psychological disorders, it seems possible that they may play a role in psychotherapy as well. For example, therapists and clients may find it difficult to communicate with one another across substantial cultural gaps, with the result that the therapeutic process is slowed or even brought to a halt. Even worse, most forms of psychotherapy were originally developed for, and have been largely used with, persons of European descent. As a result, such procedures may not be entirely suitable for use with individuals from very different backgrounds. This possibility has received considerable attention from psychologists in recent years and has led to the suggestion that psychotherapies must be made more *culturally*

sensitive (Rogler et al., 1987). This suggestion, in turn, involves three major points.

First, efforts must be made to make psychotherapy accessible to members of various ethnic groups, especially groups that are economically disadvantaged. Such persons seek psychological help far less often than other members of society, despite the fact that their need for it is just as great, possibly greater (Snowden & Cheung, 1990). Special efforts are needed to overcome language barriers and to place government-supported programs in minority communities where they will be accessible to people who don't have cars.

Second, the types of therapy employed should be consistent with the cultural, economic, and educational background of individuals to whom they are applied. For example, it would probably be quite inappropriate to employ psychoanalysis or other techniques requiring a high degree of verbal skills in a community where most people have not completed high school.

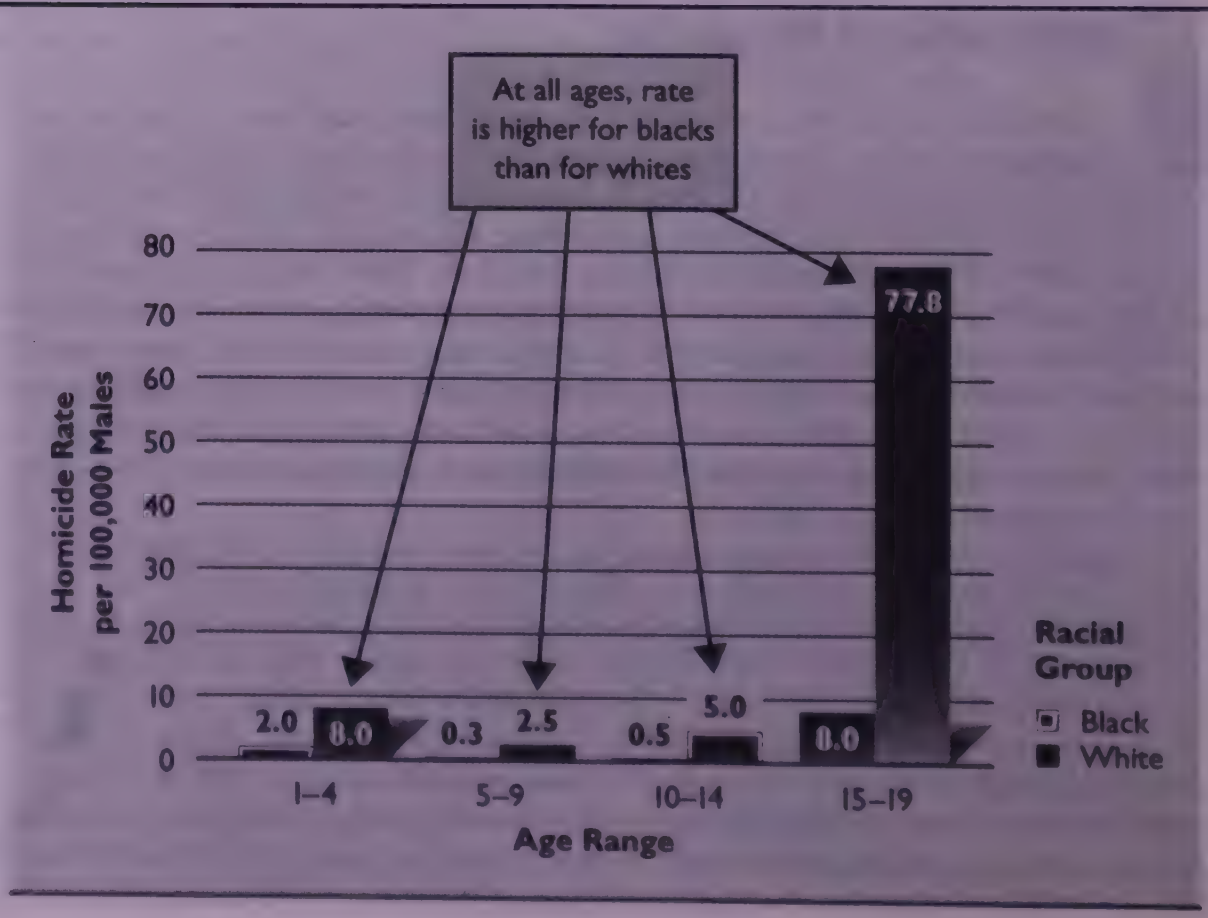
Third, therapy should take account of established values and traditions within minority cultures. For example, therapists working with people of Hispanic descent should consider the fact that Hispanics' views concerning the roles of males and females can be quite different from those of other groups in U.S. society (Rogler et al., 1987).

Finally, therapy—and other forms of social intervention—should be designed to deal with the unique problems of various ethnic groups. While basic psychological disorders appear to be much the same throughout the world, different cultural and ethnic groups often confront unique sets of circumstances and threats to their well-being. A prime example of such a circumstance is the tragically high rate of assaultive violence among young African-American men (Rodriguez, 1990; Rosenberg & Mercy, 1991). While violent crime has increased dramatically in all ethnic groups, the risk of becoming the victim of such assaults is far higher for African-American men than for any other group in the United States. Indeed, homicide is the leading cause of death among male *and* female African Americans ages fifteen to thirty-four. While other ethnic groups are also at risk, the mortality rate for young African-American men is almost ten times that for white males of the same age, as shown in Figure 15.6 (Hammond & Yung, 1993).

FIGURE 15.6

Homicide Rates as a Function of Age and Racial Group

Homicide rates are far higher among young African-American males than among whites. Homicide rates are also higher among African-American females, but the differences are not as large as those for males.
(*Source:* Based on data from Hammond & Yung, 1993.)



As a result of these alarming rates of violent death, many urban African-American children grow up in an environment in which they must confront fears that other children largely escape—the very real fear of being shot, often as an innocent bystander to others' disputes. Needless to say, this can be a negative factor for psychological development. To bring these points into focus, consider the following fact: One survey found that more than 55 percent of eighth-grade boys and 45 percent of eighth-grade girls living in an impoverished Chicago neighborhood had personally seen someone shot (Shakoor & Chalmers, 1991).

What can psychologists do to help end this tragic carnage and its negative effects on African Americans' emotional well-being? Two researchers who have studied this issue, Hammond and Yung (1993), offer several suggestions. For example, they recommend that young African Americans be given training in specific social skills—skills that may help them defuse violence and prevent its occurrence. Several programs of this type have been adopted by schools (Hammond, 1991), and while it is still too early to determine whether they will be successful, they do seem to offer one promising approach to this problem.

Similarly, Hammond and Yung (1993) suggest that psychologists and other health professionals must be trained to understand ethnic diversity and the cultures of the persons they seek to help. Only then can they comprehend the fact that young African Americans face a very different set of circumstances from those facing young Americans in many other ethnic groups, and gain crucial insights into the causes behind the alarming rates of violence.

In sum, all forms of psychotherapy, as well as other intervention techniques, should be conducted against a backdrop of awareness of cultural differences. If important ethnic and cultural differences are overlooked, much effort may be wasted, and even dedicated, talented therapists may fail to accomplish their major goals.

EARLY BIOLOGICAL THERAPY

Electrical devices such as this one (from the author's collection of antiques) were widely used by physicians in the late nineteenth century to "treat" many psychological disorders.

BIOLOGICALLY BASED THERAPIES

Mind and body are intimately linked, so in one sense everything we think, remember, feel, or do reflects activity in the central nervous system. This basic fact has led some researchers to conclude that all psychological disorders ultimately stem from, or at least involve, biological causes. In this section we'll consider forms of therapy deriving from this belief—approaches generally known as **biologically based therapies**.

EARLY FORMS OF BIOLOGICAL THERAPY

Early efforts to treat psychological disorders through biological means were described in chapter 14. As you may recall, such procedures were quite primitive and included skull surgery, beatings, and restraining devices. Lacking scientific knowledge, people were willing to try almost anything to free persons suffering from psychological disorders from the evil influences believed to cause their bizarre behavior.

It is somewhat more unsettling to realize that crude efforts at biological intervention continued even into the present century. The device shown in the photo (part of the author's collection of antiques) was in common use by physicians in the late nineteenth and early twentieth centuries. The physician would apply the electrodes to various portions of patients' anatomy and deliver electric shocks in efforts to counter anxiety, depression, and many other psychological disorders. Needless to say, such efforts were largely ineffective.

Biologically Based Therapies: *Forms of therapy that attempt to reduce psychological disorders through biological means such as drug therapy or surgery.*

ELECTROCONVULSIVE THERAPY TODAY

In electroconvulsive therapy, an electric current passes through the brain for less than a second, causing a brief seizure.

ELECTROCONVULSIVE THERAPY

The idea of using electric shock to treat psychological problems did not disappear in the twentieth century; it merely reentered psychiatry in another form. In the 1930s, many physicians believed that schizophrenics rarely had epileptic seizures. This observation, it turned out, was false. However, it led a Hungarian psychiatrist, Von Meduna, to suggest that inducing such seizures artificially might be an effective means of treating this serious disorder. At first psychiatrists produced convulsions by the injection of a drug such as camphor, but after observing the use of shock to render animals unconscious in slaughterhouses, two Italian physicians, Cerletti and Bini, proposed using powerful electric shocks instead (Bini, 1938). This procedure—known as **electroconvulsive therapy (ECT)**—became quite common, and it remains in fairly widespread use today. In fact, more than 90,000 patients receive ECT each year in the United States alone (Weiner, 1985).

In actual use, ECT involves placing electrodes on the patient's temples and delivering shocks of 70 to 130 volts for brief intervals (less than one second). These are continued until the patient has a seizure, a bodywide muscle contraction lasting at least thirty seconds. In order to prevent broken bones and other injuries, a muscle relaxant and a mild anesthetic are usually administered before the start of the shocks. Patients typically receive three treatments a week for several weeks.

Surprisingly, ECT seems to work, at least with certain disorders. It is especially effective with severe depression and appears to help many persons who have failed to respond to other forms of therapy (National Institutes of Mental Health, 1985). My grandmother received this treatment for severe depression in the early 1950s. After a number of ECT sessions, she returned, more or less, to her old self. But she clearly found these treatments very disturbing; she refused to discuss them even with me, her favorite grandson. All she would say was, "I only pray, Bobby, that it never happens to *you!*"

Unfortunately, there are important risks connected with ECT. It is designed to alter the brain, and it does, apparently producing irreversible damage in at least some cases. This has led many researchers to criticize its use and to call for its elimination as a form of therapy (Breggin, 1979). In addition, although the procedure itself is painless (patients are anesthetized before the shocks are delivered), many, like my grandmother, find it very frightening. ECT continues in use because it yields rapid improvements among depressed persons who might otherwise be at considerable risk for suicide (Martin et al., 1985). Clearly, however, it is a form of therapy that should be used with caution, and only when other, less drastic forms of therapy fail.

PSYCHOSURGERY

Electroconvulsive Therapy (ECT): *A treatment for depression in which patients receive powerful electric shocks to the head.*

Psychosurgery: *Efforts to alleviate psychological disorders by surgical means.*

In 1935 a Portuguese psychiatrist, Egas Moniz, attempted to reduce aggressive behavior in psychotic patients by severing neural connections between the prefrontal lobes and the remainder of the brain. The operation, known as *prefrontal lobotomy*, seemed to be successful: Aggressive behavior by unmanageable patients did decrease. Moniz received the 1949 Nobel Prize in Medicine for his work—but, in one of those strange twists of history, he was later shot by one of his lobotomized patients!

Encouraged by Moniz's findings, psychiatrists all over the world rushed to treat a wide range of disorders through various forms of **psychosurgery**—brain operations designed to change abnormal behavior. Tens of thousands of

patients were subjected to prefrontal lobotomies and related operations. Unfortunately, it soon became apparent that results were not always positive. While some forms of objectionable or dangerous behavior did decrease, serious side effects sometimes occurred: Some patients became highly excitable and impulsive; others slipped into profound apathy and a total absence of emotion; a few became living vegetables, requiring permanent care.

In view of these harmful outcomes, most physicians stopped performing prefrontal lobotomies. Totally banned in the Soviet Union as early as 1951, prefrontal lobotomies had all but faded from the scene worldwide by the 1960s. This dramatic decline also stemmed from the development of drugs for treating psychoses—substances we'll consider in detail below. Today psychosurgery, when it is performed, takes a much more limited form than prefrontal lobotomy. Instead of cutting connections between whole areas of the brain, modern-day brain surgery focuses on destroying tiny areas or on interrupting specific neural circuits.

While such operations sometimes seem to be effective in treating depression and uncontrollable aggression, even this limited type of psychosurgery raises important ethical questions. Is it right to destroy healthy tissue in a person's brain in the hopes that this will relieve symptoms of psychological disorder? And since the benefits are uncertain, should such irreversible procedures be permitted? These and related issues have led many to view psychosurgery as a very drastic form of treatment—something to be tried only when everything else has failed. As a result, fewer than one hundred such operations are now performed in the United States each year, and psychosurgery is no longer an important form of treatment for psychological disorders.

Drug Therapy: The Pharmacological Revolution

In 1955, almost 600,000 persons were full-time resident patients in psychiatric hospitals in the United States. Twenty years later, this number had dropped below 175,000. Were Americans achieving mental health at a dizzying pace? Absolutely not. What happened in those years was something many describe as a *pharmacological revolution:* A wide range of drugs effective in treating many serious psychological disorders was developed and put to use. So successful was **drug therapy** in reducing major symptoms that hundreds of thousands of persons who had previously been hospitalized for their own safety (and that of others) could now be sent home for treatment as outpatients. What are these wonder drugs, and how do they produce their beneficial effects? It is to these questions that we turn next.

THE PHARMACOLOGICAL REVOLUTION

Drugs effective in treating a wide range of psychological disorders were developed during the 1950s and 1960s. As a result, the number of full-time patients in psychiatric hospitals decreased dramatically.

Drug Therapy: *Efforts to treat psychological disorders through administration of appropriate drugs.*

ANTIPSYCHOTIC DRUGS If you had visited the wards of a psychiatric hospital for seriously disturbed persons before about 1955, you would have observed some pretty wild scenes—screaming, bizarre actions, nudity. If you had returned just a year or two later, however, you would have observed a dramatic change: peace, relative tranquillity, and many patients now capable of direct, sensible communication. What accounted for this startling change? The answer involves development of *antipsychotic drugs,* sometimes known as the *major tranquilizers.* The first of these was *reserpine,* which, as early as the 1950s, was found to exert a calming effect on mental patients. But reserpine produced harmful side effects such as low blood pressure and, in some patients, severe depression. Thus, its usefulness was quite restricted.

Much more effective relief of psychotic symptoms was provided by a family of drugs known as *phenothiazines.* The antipsychotic effects of these drugs

were discovered by accident. Phenothiazine is also found in antihistamines—drugs widely used to relieve the symptoms of colds and allergies. As antihistamines came into widespread use for colds, it was found that they also had tranquilizing effects. This led chemists to examine other phenothiazines; and in 1950 a new derivative called *chlorpromazine* (trade name Thorazine) was produced. It was an immediate success and within a few months had been given to almost two million patients. Chlorpromazine was soon followed by many other related drugs in the same chemical family, although today, there are also some antipsychotic drugs that are not phenothiazines.

Antipsychotic drugs relieve a wide range of symptoms, including hallucinations, thought disorders, anxiety, and extreme hostility. The overall result is nothing short of amazing. Patients who are almost totally out of touch with reality and must be given custodial care can, after receiving the drugs, communicate with others and care for themselves. Perhaps even more important, they improve to the point where they become candidates for various forms of psychotherapy. The scope of the changes produced is perhaps best summarized by the following statistic: In the mid-1950s, 70 percent of all persons diagnosed as suffering from schizophrenia spent most of their lives in mental hospitals. At present, this figure is less than 5 percent.

How do the antipsychotics produce such remarkable effects? Current evidence suggests that they block dopamine receptors in the brain. As noted in chapter 14, the presence of an excess of this neurotransmitter, or increased sensitivity to it, may play a role in the development of schizophrenia. Whatever the precise mechanisms involved, there can be little doubt that the development of antipsychotic drugs has helped transform many previously hopeless patients into ones responsive to psychotherapy.

The use of these drugs, however, is not without drawbacks. They often produce fatigue and apathy as well as calming effects. And after receiving antipsychotic drugs for prolonged periods of time, many patients develop a side effect called **tardive dyskinesia**: loss of motor control, especially in the face. As a result, they experience involuntary muscle movements of the tongue, lips, and jaw. These motor reactions produce difficulties with speech and sometimes result in bizarre facial expressions. In order to avoid such side effects, many psychiatrists no longer place patients on maintenance doses of the drug. Rather, they employ *target dosing:* They administer drugs only when serious symptoms appear and discontinue medication when the symptoms are eliminated. One new antipsychotic drug, *clozapine*, seems to be effective without producing tardive dyskinesia. It is very expensive, however, and this limits its potential use.

While the antipsychotic drugs are certainly of great value, they do not provide a total answer to schizophrenia and other serious psychological disorders. True, the most bizarre symptoms of schizophrenia decrease under medication. However, this does not usually result in an individual who can return to normal life. Persons on antipsychotic drug therapy often remain somewhat withdrawn and show relatively slow reactions and reduced levels of affect. And more serious symptoms often reappear if the drug therapy is stopped. In short, antipsychotic drugs seem to relieve the major symptoms of schizophrenia but don't deal with the causes that underlie them. Thus, it is imperative that persons receiving drug therapy also receive other forms of psychotherapy if they are capable of participating in them. Otherwise they may remain seriously disturbed, and unless they have families willing to care for them when they are released from mental institutions, they may join the ranks of homeless street people, of which there are already several million in the United States alone.

Tardive Dyskinesia: *A side effect of prolonged exposure to antipsychotic drugs in which individuals experience involuntary muscular movements, especially of the face.*

Antidepressant Drugs Shortly after the development of chlorpromazine, drugs effective in reducing depression also made their appearance. There are

two basic types of such compounds: the *tricyclics* and the *monoamine oxidase inhibitors* (MAO inhibitors). Both seem to exert their antidepressant effects by increasing the concentration of certain neurotransmitters, primarily serotonin and norepinephrine, in the synaptic gap. It appears, however, that there may be several different types of depression and that antidepressant drugs may exert their effects through a wide range of biochemical mechanisms. While these drugs influence neurotransmitter concentrations very quickly, their antidepressant effects are delayed, often taking several days or longer to appear. This suggests that the biochemical mechanisms underlying depression are complex, to say the least.

Both tricyclics and MAO inhibitors produce potentially dangerous side effects. For trycyclics, these include drowsiness, irregularity in heartbeat, blurred vision, and constipation. For MAO inhibitors, the most important side effect is *hypertension*—a rise in blood pressure above normal levels. In some cases MAO inhibitors can trigger a *hypertensive crisis* involving severe headache, intracranial bleeding, and even death. Because of such side effects, MAO inhibitors are used less frequently than tricyclics in the treatment of depression.

Since both tricyclics and MAO inhibitors show delayed action and because of their potential side effects, several other, even more effective drugs have been developed. Among these, *fluoxetine* (Prozac) is perhaps the most widely used. This drug, which seems to operate by blocking the reuptake of serotonin, has fewer and milder side effects than older antidepressants. Yet it matches or exceeds tricyclics in terms of countering depression. For these reasons, it is now the most widely prescribed antidepressant in the United States (Grilly, 1989). Prozac has been the subject of controversy, however, because a small number of persons experience dangerous side effects from it: They become manic, hyperactive, or even dangerously violent (Angier, 1990). A newer drug, Zoloft, seems less likely to produce such effects.

One final point: while drugs *are* often effective in treating depression, research evidence suggests that they are not necessarily more effective than several forms of psychotherapy, especially cognitive behavioral and cognitive therapies (Robinson, Berman, & Neimeyer, 1990). Since psychotherapy avoids the potential dangers involved in the use of any drug, it appears to be the more conservative form of treatment.

Antianxiety Drugs Alcohol, a substance used by many people to combat anxiety, has been available for thousands of years. As I'm sure you know, however, it has important negative side effects. Synthetic drugs with antianxiety effects—sometimes known as *minor tranquilizers*—have been manufactured for several decades. The most widely prescribed at present are the *benzodiazepines*. This group includes Valium, Ativan, Xanax, and Librium. In 1989, over 52 million prescriptions for these drugs were written in the United States alone (Shader, Greenblatt, & Balter, 1991). Another widely used antianxiety drug is *propanediol* (meprobamate); this drug seems to exert antianxiety effects mainly by reducing muscular tension. Yet another drug that has recently attained favor among physicians in treating mild anxiety is BuSpar.

The most common use for antianxiety drugs, at least ostensibly, is as an aid to sleep. At first glance, they seem safer for this purpose than *barbiturates*, since they are less addicting. However, substances deriving from the benzodiazepines remain in the body for longer periods of time than do those from barbiturates and can cumulate until they reach toxic levels. Thus, long-term use of these antianxiety drugs can be quite dangerous. In addition, when they are taken with alcohol, their effects may be magnified; this is definitely a combination to avoid. The benzodiazepines seem to produce their effects by chemically binding to receptors at synapses, thus blocking neural transmis-

sion. Common side effects of these antianxiety drugs include fatigue, drowsiness, and impaired motor coordination, so people taking them should avoid driving or operating power tools.

KEY POINTS

- Electroconvulsive therapy, used to treat depression, involves the delivery of strong shocks to the brain.
- Psychosurgery is sometimes effective in treating psychological disorders, but it raises serious ethical issues and is rarely performed.
- Antipsychotic drugs reduce a wide range of symptoms, including hallucinations and extreme hostility.
- Antidepressant drugs are highly effective in countering depression.
- Antianxiety drugs are widely prescribed and may be effective, but are habit-forming and often produce side effects.
- Lithium is effective in countering manic disorders.

LITHIUM AND MOOD DISORDERS In the late 1940s, findings were reported indicating that compounds of lithium, such as lithium carbonate, could be effective in treating *manic disorders.* For more than twenty years this evidence was largely ignored, mainly because researchers could not conceive of any mechanisms through which this simple substance could produce these changes. Now, however, it seems clear that lithium *is* indeed helpful in treating manic disorders. About 60 to 80 percent of manic states can be quickly brought to a close by administration of lithium (Campbell, Perry, & Green, 1984). It can sometimes terminate depressive episodes, especially in persons with bipolar disorders. Lithium can be quite dangerous: Excessive doses can cause convulsions, delirium, and even death—and for many patients the effective dose is close to the overdose level. Thus, it is crucial that blood levels of lithium be closely monitored in persons who take it. Another problem is that after people have taken the drug for two years or more, manic episodes occur again when it is discontinued. Since it *is* effective in diminishing wild mood swings, though, lithium continues in widespread use.

THE SETTING FOR THERAPY: From Institutional Care to the Community

Earlier I noted that during the 1950s and 1960s, there was literally an outpouring of patients from psychiatric hospitals, produced in large measure by the *pharmacological revolution.* Where did these people go? How are they receiving treatment today? These are the issues we'll now consider.

STATE INSTITUTIONS: Custodial Care

When large state institutions for treating psychological disorders were founded, in the nineteenth century, they offered a major breakthrough: No longer would persons suffering from mental afflictions be chained, tortured, and abused. Instead, they would receive enlightened medical care. The promise of these institutions, however, was not fulfilled. Most were built in isolated rural areas, mainly because land was less expensive there than in cities; as a result, attracting competent medical staff was a serious problem. Further, budgets rarely kept pace with growing patient populations. The result was predictable: These large state-supported facilities soon became largely *custodial.* They provided little in the way of active treatment, and few patients ever left "cured" of their problems. Yet despite this fact, there was little choice for the families of seriously disturbed individuals: It was either commitment to one of these large institutions or remaining at home. Nothing in between existed.

Partly in response to these conditions, many private institutions for the treatment of psychological disorders were founded. Depending on the physicians who ran them, they adopted different methods of treatment, and provided sharply contrasting *therapeutic environments*—different settings for interactions with staff and different living conditions. Many of these institutions were *psychodynamic* in orientation, since psychiatry as a field was heavily influenced by Freudian concepts. In such institutions the staff endeavored to provide an environment in which early damage to the patients' personalities could be repaired. They conducted therapy with all patients who could participate in these procedures and assigned patients to living quarters on the basis of their problems. Other private institutions adopted different approaches. For example, in some, *milieu therapy* was practiced. This approach, which had important ties to humanistic therapies, provided an environment designed to foster independence and self-respect among patients. The atmosphere was warm and accepting, and patients were kept busy with occupational therapy, recreational activities, and other projects.

Needless to say, only relatively wealthy persons were fortunate enough to enter such private facilities. For most persons suffering from psychological disorders, hospitalization meant being sent—often against their will—to the large custodial state institutions described above.

INSTITUTIONS FOR TREATING PSYCHOLOGICAL DISORDERS

Large state institutions for treating psychological disorders were placed far from urban areas and operated on limited budgets. As a result, they were often able to provide only custodial care to patients.

COMMUNITY MENTAL HEALTH CENTERS: Bringing Care to Where It's Needed

As large mental hospitals discharged more and more patients who responded well to drug therapy, the question of where these persons should go for continued treatment rose to prominence. That many patients required further treatment was obvious, but in the 1950s there was nowhere for them to receive it. In the United States and other countries, the answer was the founding of **community mental health centers**. Distributed throughout the country geographically, these centers were designed to bring treatment for psychological disorders directly to the community—to where people lived.

What kind of services do community mental health centers deliver? A broad range. First, such centers provide *outpatient services*—treatment for patients who live at home and come to the mental health center once or twice a week, or as the need arises. Such treatment includes *aftercare*—treatment for persons newly released from the hospital—as well as various kinds of assessment and therapy. The basic goal is simple: to provide these services to people without disturbing their daily routines.

In addition, some community mental health centers offer *inpatient services:* They provide a place where persons requiring further hospitalization can receive it—again, in a location close to their homes. This makes it much easier for friends and relatives to visit than was true for the geographically isolated state institutions. And in keeping with the philosophy of active treatment rather than custodial care, patients receive therapy during their stays.

Third, community mental health centers provide *emergency services*—places to which people can turn in moments of crisis, even late at night and over weekends. These services are delivered by satellite storefront clinics that remain open at night or at the emergency rooms of local hospitals, to which community mental health centers provide teams of trained professionals.

Finally, these centers provide *consultation services*—advice and training to help members of the community deal with psychological problems. For example, such programs have trained physicians, teachers, and clergy in how to deal with psychologically disturbed persons. And they have taught police

Community Mental Health Centers: *Facilities for the delivery of mental health services located in communities where clients live.*

skills valuable in dealing with family violence and other situations in which people's emotions run high.

In sum, community mental health centers provide an invaluable multifaceted resource for persons experiencing psychological problems and their families. They have definitely helped fill the gap into which large numbers of former patients at state institutions were dropped after their release.

PREVENTION: Heading Off Trouble before It Begins—or Becomes Serious

Therapies, whatever their nature, are designed to correct or repair damage that has already occurred: They swing into action *after* individuals have begun to experience psychological disorders. A different approach to psychological problems is *prevention*. When psychologists use this term, they refer to one of three goals: (1) **primary prevention**, or preventing disorders from developing; (2) **secondary prevention**, or early detection and treatment so that minor disorders do not become major ones; and (3) **tertiary prevention**, or efforts to minimize the harm done to the individual and to society. In an important sense, prevention is where a considerable part of the action promises to be in the mental health field in the years ahead. Efforts are now underway to help prevent many serious psychological disorders—and social problems—through a wide range of programs. The scope of these efforts and of the problems they address is extremely broad (e.g., Berman & Jobes, 1991). As an example of such work, let's look at recent efforts aimed at preventing child abuse.

Primary Prevention: *Techniques aimed at preventing the occurrence of psychological disorders.*

Secondary Prevention: *Techniques that focus on early detection of psychological disorders so that minor disturbances will not develop into major ones.*

Tertiary Prevention: *Techniques designed to minimize the harm done by psychological disorders.*

CHILD ABUSE Each year many thousands of children are physically abused by their parents. Indeed, in the United States alone, more than 1 million cases of child abuse are reported each year (Krugman & Davidson, 1990). Can anything be done to reduce this tragedy? Growing evidence provides a mildly encouraging answer. Conditions associated with child abuse by parents have been identified (see Table 15.1), and programs designed to help counter the effects of these conditions—and so to reduce the incidence of child abuse—have been devised and tested (e.g., Wolfe, Sandler, & Kaufman, 1981). The results obtained have been encouraging. Consider, for example, a project involving 400 pregnant women who, because of a cluster of factors such as those in Table 15.1, were at risk for showing child abuse. One group received free transportation to medical appointments. A second received nine visits to the home by a nurse during pregnancy in addition to the free transportation.

TABLE 15.1

Factors Related to Child Abuse

The greater the extent to which a parent experiences the factors and conditions shown here, the greater the likelihood that the parent will abuse his or her children.
(*Source:* Based on data from Nietzel & Himelein, 1986.)

PARENT'S HISTORY	CURRENT FAMILY SITUATION	PARENT'S APPROACH TO CHILD REARING
Experience of abuse or neglect	Social isolation	Infrequent praise
Lack of affection from own parents	Marital discord	Strict demands
Large family	Parental retardation or illiteracy	Low level of supervision
Teenage marriage	Stressful living conditions	Early toilet training
		Disagreements with partner over child-rearing practices

Women in a third group also received regular visits by a nurse extended to the child's second birthday. Moreover, during these visits, the nurse provided health consultations and information about parenting. In contrast, women in a control group received none of these benefits. Results were clear: 19 percent of those in the control group abused or neglected their children within the first two years of life. In contrast, only 4 percent of those receiving the maximum intervention showed such behavior. (The other two groups were in between.) These findings, and similar results in other research, indicate that appropriate preventive programs can substantially reduce the incidence of child abuse. Given the damaging effects of child abuse on later development, it seems clear that such programs may be worth more than their weight in gold.

KEY POINTS

- Large state institutions often provided only custodial care for psychologically disturbed persons.
- As effective drug therapies became available, these state institutions discharged large numbers of patients, some of whom have received further treatment in community mental health centers.
- In recent years, growing attention has been focused on prevention of psychological disorders.

Making Psychology Part of Your Life

How to Choose a Therapist: A Consumer's Guide

The odds are quite high that at some point during your life, you or someone very close to you will experience a psychological disorder. Depression, phobias, anxiety—these are very common patterns. If there's one point I hope this chapter has made clear, it is this: Effective help is available. When psychological problems occur, don't hesitate to seek assistance. But how should you go about obtaining such help—choosing a therapist? Here are some basic pointers.

1. *Where to go first.* The first question—how to start the process—is perhaps the trickiest. While you are a student, this task is fairly simple. Virtually every college or university has a department of psychology and a student health center, and in these locations, you are almost certain to find someone who can direct you to valuable sources of help—clinics, individual practitioners, referral services. So don't be shy. If you feel that you or someone close to you needs help, make an appointment to see someone.

But what if you are no longer a student and have no contact with university campuses? Can you still phone and ask for help from the nearest department of psychology? Absolutely. Psychology, after all, has a dual nature: It is both a branch of science *and* a helping profession. So the fact that you are not a student should not prevent you from asking for assistance in locating a therapist.

If for some reason this is not practical, there are other routes you can follow. First, you can ask your physician or some member of the clergy to direct you to the help you need. Both will almost certainly know someone you can contact in this regard. If you have no local physician and don't know any clergy, you can contact your local Mental Health Association. This organization is listed in the phone book and can direct you to the help you need. In short, there are several ways to proceed. Not knowing where to begin is definitely *not* a good excuse for delay.

2. *Choosing a therapist.* Let's assume that by following one of the routes outlined above, you have obtained the names of several different therapists. How can you choose among them? Several guidelines are useful.

First, always check for *credentials.* Therapists should generally be trained professionals. Before you consult one, be sure that this person has a PhD in psychology, an MD degree plus a residency in psychiatry, or other equivalent training. While such credentials don't guarantee that the therapist can help you, they are an important step in this direction.

Second, try to find out something about the kind of disorders in which each therapist specializes. Most will readily give you this information, and what you are looking for is a good *match* between your needs and the therapist's special competence.

Third, it is often helpful to know something about a therapist's preferred techniques of therapy. Most psychologists are quite eclectic: They use a wide variety of treatment procedures and tailor these to the needs of individual clients. Still, many therapists are most familiar with, and most highly trained in, the use of specific procedures. If you are uncomfortable with the particular type of therapy favored by a given therapist, then by all means look elsewhere.

3. *Signs of progress: How long should therapy take?* If therapy is going well, both you and the therapist will know it. You'll be able to see the beneficial changes in your behavior, your thoughts, and your feelings. But what if it is not going well? When and how should you decide to go elsewhere? This is a difficult decision, but a rough rule of thumb is this: If you have been visiting a therapist regularly (once a week or more) for three months and see no change, it may be time to ask the therapist whether she or he is satisfied with your progress. Most forms of therapy practiced by psychologists at present are relatively short-term in nature: They are designed to produce results relatively quickly. If several months have passed and your distress has not decreased, it is probably time to raise this issue with your therapist. In fact, it is a good idea to ask about the length of treatment when you first begin. Given the fact that all individuals differ, length of treatment is hard to predict. Still, an experienced therapist should have a general idea of how long therapy should take and will gladly share this information with you.

4. *Danger: When to quit.* Therapy is designed to help—to relieve the distress of psychological disorders. Unfortunately, though, there are instances in which it can actually hurt. Estimates indicate that negative effects may occur as often as 10 percent of the time (Lambert, Shapiro, & Bergin, 1986). How can you tell that you are in danger of such outcomes? Several basic points can help.

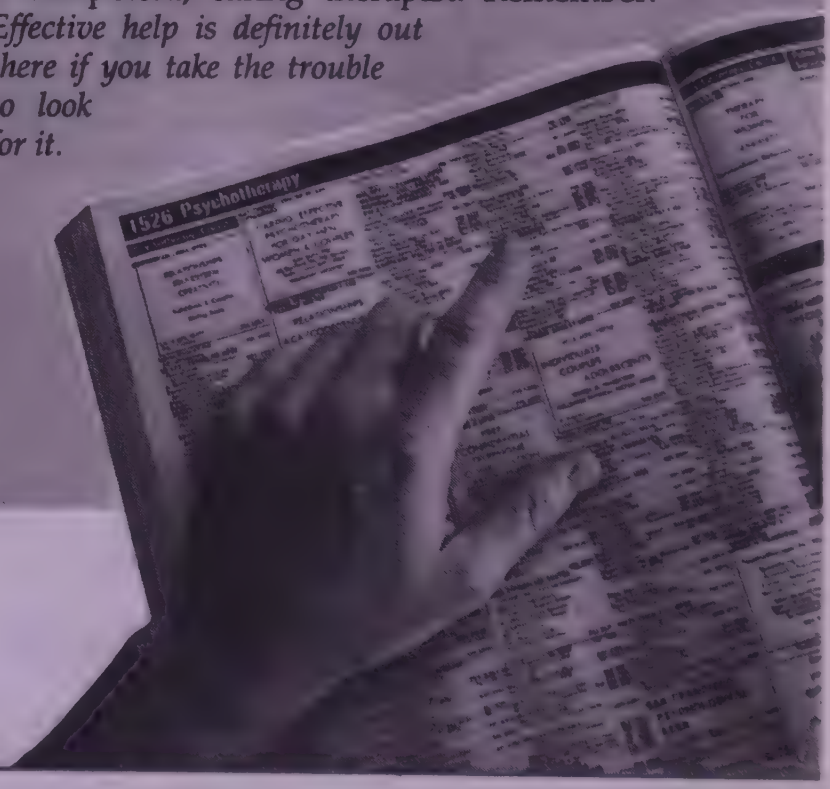
First, and most obvious, if you or the people around you notice that you are actually becoming more distressed—more depressed, more anxious, more nervous—you should take a step back and ask yourself whether you are satisfied with what is happening. It may be that these trends are only temporary. Still, signs that things are actually getting worse are certainly grounds for concern, and this is an issue you should raise with your therapist.

Second, never, under any circumstances, should you agree to performing activities during therapy that run counter to your own moral or ethical principles. A very large majority of therapists adopt extremely high standards and would never dream of making such requests. Sad to relate, however, there are a few who will take advantage of the therapeutic relationship to exploit their patients. The most common forms of such exploitation are sexual in nature. Unprincipled therapists may suggest that their clients engage in sexual relations with them as part of their "treatment." *This is never appropriate and is strongly censured by all professional associations.* So if your therapist makes such suggestions, it's time to leave.

Third, beware of exaggerated claims. If a therapist tells you that she or he can guarantee to remake your life, to convert you into a powerhouse of human energy, or to assure you of total happiness, be cautious. This is probably a sign that you are dealing with an unprincipled—and probably poorly trained—individual. Again, beat a hasty retreat.

All of these suggestions are merely *guidelines* you can follow in order to be a sophisticated consumer of psychological services. There may be cases, for example, in which therapy requires considerably longer than the time period noted above; in which a therapist has valid reasons for being reluctant to discuss the procedures she or he will use; or in which someone without full credentials can be very helpful. These guidelines, however, should help you to avoid some of the pitfalls that exist with respect to finding a competent, caring therapist. Remember:

Effective help is definitely out there if you take the trouble to look for it.



How would you seek help for psychological problems, if it became needed?

Summary and Review of Key Points

Psychotherapies: Psychological Approaches to Psychological Disorders

Key Terms:

psychotherapies, p. 586
therapeutic alliance, p. 587
psychodynamic therapies, p. 587
free association, p. 588
resistance, p. 588
transference, p. 589
humanistic therapies, p. 590
client-centered therapy, p. 590
conditions of worth, p. 590
Gestalt therapy, p. 591
behavior therapies, p. 592
systematic desensitization, p. 593
token economies, p. 594
cognitive therapy, p. 595
rational emotive therapy, p. 596
cognitive behavior therapy, p. 597
constructivist cognitive therapy, p. 598

- Psychotherapies are forms of therapy in which a trained professional establishes a special relationship with a person experiencing psychological distress and makes efforts to bring about beneficial changes in the behavior, feelings, or thoughts of this person.
- Psychodynamic therapies such as psychoanalysis are based on the view that psychological disorders stem largely from hidden conflicts. Classical Freudian psychoanalysis is very famous, but there is little evidence for its effectiveness. Modern versions of psychodynamic therapy focus more on patients' current problems than on their past histories.
- Humanistic therapies assume that psychological disorders stem from interference by the environment with personal growth. Rogers's client-centered therapy focuses on eliminating unrealistic conditions of worth in a therapeutic environment of unconditional positive regard. Gestalt therapy focuses on helping clients acknowledge disowned parts of their own personalities and feelings. Humanistic approaches have been criticized for being vague, but several of their concepts have been validated in ongoing research.
- Behavior therapies assume that psychological disorders stem from faulty learning. Behavior therapies based on principles of classical conditioning attempt to eliminate maladaptive reactions through extinction or desensitization. Therapies based on operant conditioning offer positive reinforcement for adaptive behaviors. Therapies based on observational learning employ modeling to change behaviors.
- Cognitive therapies assume that psychological disorders stem from irrational thoughts. Rational emotive therapy focuses on inducing individuals to recognize and reject irrational assumptions and thoughts. Cognitive-behavior therapy for depression seeks to eliminate self-defeating modes of thought. Constructivist cognitive therapy focuses on countering inaccurate perceptions by helping individuals understand their own unique views of the world.

Group Therapies: Working with Others to Solve Personal Problems

Key Terms:

group therapies, p. 598
psychodrama, p. 598
encounter groups, p. 599
sensitivity-training groups, p. 599
self-help groups, p. 600

- Psychodynamic group therapies such as psychodrama are designed to help individuals bring inner conflicts to the surface. Behavioral group therapies focus on changing specific aspects of behavior, such as social skills or assertiveness. Humanistic group therapies focus on enhancing personal growth and improving self-knowledge.
- Self-help groups consist of persons who share a problem. Such groups provide social support for members and may be helpful. There is evidence that subliminal stimuli can affect our moods and attitudes, but careful tests provide no support for the view that subliminal self-help audiotapes can produce beneficial effects.

THERAPIES FOCUSED ON INTERPERSONAL RELATIONS: MARITAL AND FAMILY THERAPY Key Terms: marital therapy, p. 603 family therapy, p. 604	• Marital or couple therapy focuses on improving communication and changing faulty attributions within couples. Family therapy focuses on improving relations among family members by reducing contradictory communications and by altering family structure.
PSYCHOTHERAPY: SOME CURRENT ISSUES	• Growing evidence indicates that psychotherapy is effective. Surprisingly, however, there is little evidence that contrasting types of therapy differ in overall success. This may be due to the fact that all forms of therapy share certain crucial features. • There is a pressing need for a multicultural perspective in psychotherapy, and psychologists are devoting increased attention to this issue.
BIOLOGICALLY BASED THERAPIES Key Terms: biologically based therapies, p. 611 electroconvulsive therapy, p. 612 psychosurgery, p. 612 drug therapy, p. 613 tardive dyskinesia, p. 614	• Early forms of biological therapy involved use of electric shock, beatings, and surgery. Electroconvulsive therapy, used to treat depression, involves delivery of strong shocks to the brain. Psychosurgery raises serious ethical questions and is rarely performed. • Drug therapy provides effective means for treating many psychological disorders. Antipsychotic drugs reduce a wide range of symptoms, including hallucinations and extreme hostility. Antidepressant drugs are effective in countering depression but may produce side effects such as hypertension. Antianxiety drugs are widely prescribed and may be effective, but are habit-forming and often produce side effects. Lithium is effective in countering manic disorders.
THE SETTING FOR THERAPY: FROM INSTITUTIONAL CARE TO THE COMMUNITY Key Terms: community mental health centers, p. 617 primary prevention, p. 618 secondary prevention, p. 618 tertiary prevention, p. 618	• Large state institutions usually provided only custodial care for psychologically disturbed patients. As large numbers of persons were released from such institutions because of improved drug therapies, community mental health centers were established. These centers provide a wide range of services. • Growing attention has recently been focused on the prevention of psychological disorders. Such efforts have focused on many problems, including child abuse.

Critical Thinking Questions

Appraisal	If various forms of therapy are as effective as suggested in this chapter, then why are psychological disorders so common? Why, in short, don't more people seek out appropriate treatment for their psychological problems?
Controversy	There is a huge market for self-help books and audiotapes, and many people continue to believe that they can solve their own psychological problems with the aid of these materials. Yet existing evidence indicates that most of these products are useless, and that some may do more harm than good. In view of this fact, do you think that steps should be taken to ban their sale?
Making Psychology Part of Your Life	Now that you know something about how various forms of therapy work, do you think you are more likely to seek out the help of a trained psychologist or other professional if *you* experience psychological distress? If not, what factors would deter you from doing so?

Social Thought and Social Behavior

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- *Attribution: Understanding the Causes of Others' Behavior*
- *Social Cognition: How We Process Social Information*
- *Attitudes: Evaluating the Social World*

SOCIAL BEHAVIOR: INTERACTING WITH OTHERS 642
- *Prejudice: Distorted Views of the Social World . . . and Their Consequences*
- *Social Influence: Changing Others' Behavior*
- *Prosocial Behavior: When We Help . . . and When We Don't*
- *Attraction, Love, and Close Relationships*
- *Environmental Psychology: How the Physical Environment Affects Social Behavior—and Vice Versa*

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SPECIAL SECTIONS

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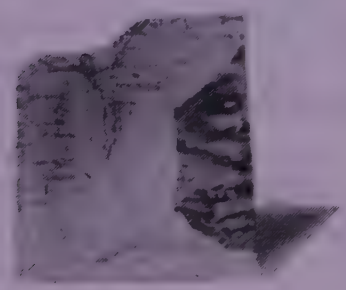


Being totally cut off from other people—that's the theme of many books and stories. Can you imagine what that would be like? Whether the story takes place on a desert island or in space, our reactions are much the same: We sympathize with the person experiencing such isolation, and we shudder at the thought of experiencing it ourselves. Our reactions in this respect are far from surprising, for other people truly play a crucial role in our lives. They are the source and focus of our most important emotions—love, anger, envy, jealousy. They are the source of many of our most valued forms of reward—praise, approval, sympathy, affection; *and* of our most devastating forms of punishment—criticism, rejection, disapproval. Life without other people is, in a very real sense, unimaginable. Yet, despite this fact, other persons often remain something of a mystery to us. They say and do things we don't expect; have

motives we don't understand; and, as noted in chapter 3, often see the world through very different eyes than we do. For this reason, we do not merely *interact* with others; we also spend lots of time *thinking* about them. These two topics—social thought and social behavior—serve as the major focus of **social psychology**, the branch of psychology that investigates all aspects of social thought and social behavior.

Social psychology is an extremely diverse field. Indeed, when I teach this course, I describe it to my students as "the field that covers everything from love to hate, and whatever's in between." To provide you with an overview of this intriguing field, I'll proceed as follows. First, I'll introduce several aspects of *social thought: attribution*—our efforts to understand the causes behind others' behavior; *social cognition*—how we notice, store, remember, and process social information; and *attitudes*—our cognitive representations and evaluations of various features of the social or physical world.

WE DO NOT MERELY INTERACT WITH OTHERS; WE ALSO SPEND LOTS OF TIME THINKING ABOUT THEM.

After considering social thought, we'll turn to important aspects of *social behavior*: *prejudice*—negative attitudes toward the members of various social groups; *social influence*—the many ways in which individuals attempt to change others' behavior; *prosocial behavior*—actions we perform that benefit others; and *attraction, love,* and *close relationships*—the questions of why we like or dislike other persons, why we fall in (and out) of love, and how we form close relationships with others. We'll conclude by briefly examining effects of the physical environment on social behavior and how social behavior, in turn, affects the physical environment. These are important issues in the field of *environmental psychology*. We'll consider another important aspect of this field—how the physical environment influences task performance—in chapter 17. Additional aspects of social psychology are covered elsewhere in this book: *aggression* in chapter 10 and leadership in chapter 17.

Social Thought: Thinking about Other People

How much time do you spend thinking about other people? Probably, much more than you realize. Whenever you try to figure out why people have acted in various ways, or whenever you try to make various judgments about them (for example, will someone make a good roommate, or like one of your friends?), you are engaging in *social thought*. In short, there are many different aspects to this basic process. In this discussion we'll focus on three that have been identified by social psychologists as among the most important: *attribution, social cognition,* and *attitudes.*

Attribution: Understanding the Causes of Others' Behavior

Imagine the following situation. You're standing at a counter in a store waiting your turn, when suddenly another customer walks up and hands the clerk an item he wishes to purchase. How do you react? While your first response is probably "with anger!", the way you react really depends on your perceptions of *why* this person has cut in front of you. Did he do it on purpose? In that case you are almost certain to get angry. But perhaps he just didn't see you, or maybe he is from another culture and is unfamiliar with the concept of waiting

Social Psychology: *The branch of psychology that studies all aspects of social behavior and social thought.*

in line. In short, it's not just what this person did that matters; your perception of *why* he did it is important, too. This question—*why* others act the way they do—is one we face every day in a wide range of contexts. The process through which we attempt to answer this question—to determine the causes behind others' behavior—is known as **attribution.**

"I'll be straight with you. I was put on this planet to make your life miserable."

ATTRIBUTION: DETERMINING THE CAUSES BEHIND OTHERS' BEHAVIOR

Why do other people act as they do? This is a question we often ask during social interaction. This woman has received a clear-cut answer to this question—but we doubt that she likes it!

(*Source:* Drawing by Bruce Eric Kaplan; © 1993 The New Yorker Magazine, Inc.)

CAUSAL ATTRIBUTION: HOW WE ANSWER THE QUESTION "WHY?" Our efforts to understand the causes behind others' behavior take many forms. For example, we are often interested in identifying people's major traits—what kind of persons they really are (Gilbert et al., 1992; Jones & Davis, 1965). One of the most important questions we ask, however, is this: "Do others' actions stem mainly from *internal* causes (their own characteristics, motives, intentions), largely from *external* factors (some aspect of the physical or social world), or from some combination of the two?" How do we go about reaching such conclusions? A theory proposed by Kelley (1972; Hilton & Slugoski, 1986) provides some intriguing insights.

According to Kelley, we seek to determine whether other persons' actions stem mainly from internal or external causes by focusing on three types of information. First, we consider **consensus**—the extent to which others react in the same manner to some stimulus or event as the person on whom we are focusing. Second, we consider **consistency**—the extent to which this person reacts to this stimulus or event in the same way on *other occasions.* And finally, we consider **distinctiveness**—the extent to which the person reacts in the same manner to other, different stimuli or events.

Kelley suggests that we are most likely to attribute another's behavior to internal causes under conditions where consensus and distinctiveness are *low,* but consistency is *high.* In contrast, we are most likely to attribute another's behavior to external causes under conditions where consensus, consistency, and distinctiveness are all *high.* Finally, we attribute behavior to a combination of these factors when consensus is *low,* but consistency and distinctiveness are *high.* Let's apply these suggestions to the "cutting in line" example above.

First, imagine that consistency is high, while both consensus and distinctiveness are low. That is, the person who cuts in front of you does so on other occasions, too (high consistency); few other people engage in such behavior (low consensus); and this person pushes ahead of others in different contexts, such as while driving or in grocery stores (low distinctiveness). Here, Kelley's theory predicts that you will attribute the individual's behavior to *internal factors,* concluding, perhaps, that he is a rude, inconsiderate person who needs to learn some manners.

In contrast, imagine that consistency, consensus, and distinctiveness are all high. That is, this person pushes ahead of you on other occasions (high consistency); many other people also push ahead of you (high consensus); and this person does not push ahead of others in different contexts (high distinctiveness). Here, Kelley's theory predicts that you will attribute the person's behavior to external factors—something about the current situation, perhaps

Attribution: *The processes through which we seek to determine the causes behind others' behavior.*

Consensus: *The extent to which behavior by one person is shown by others as well.*

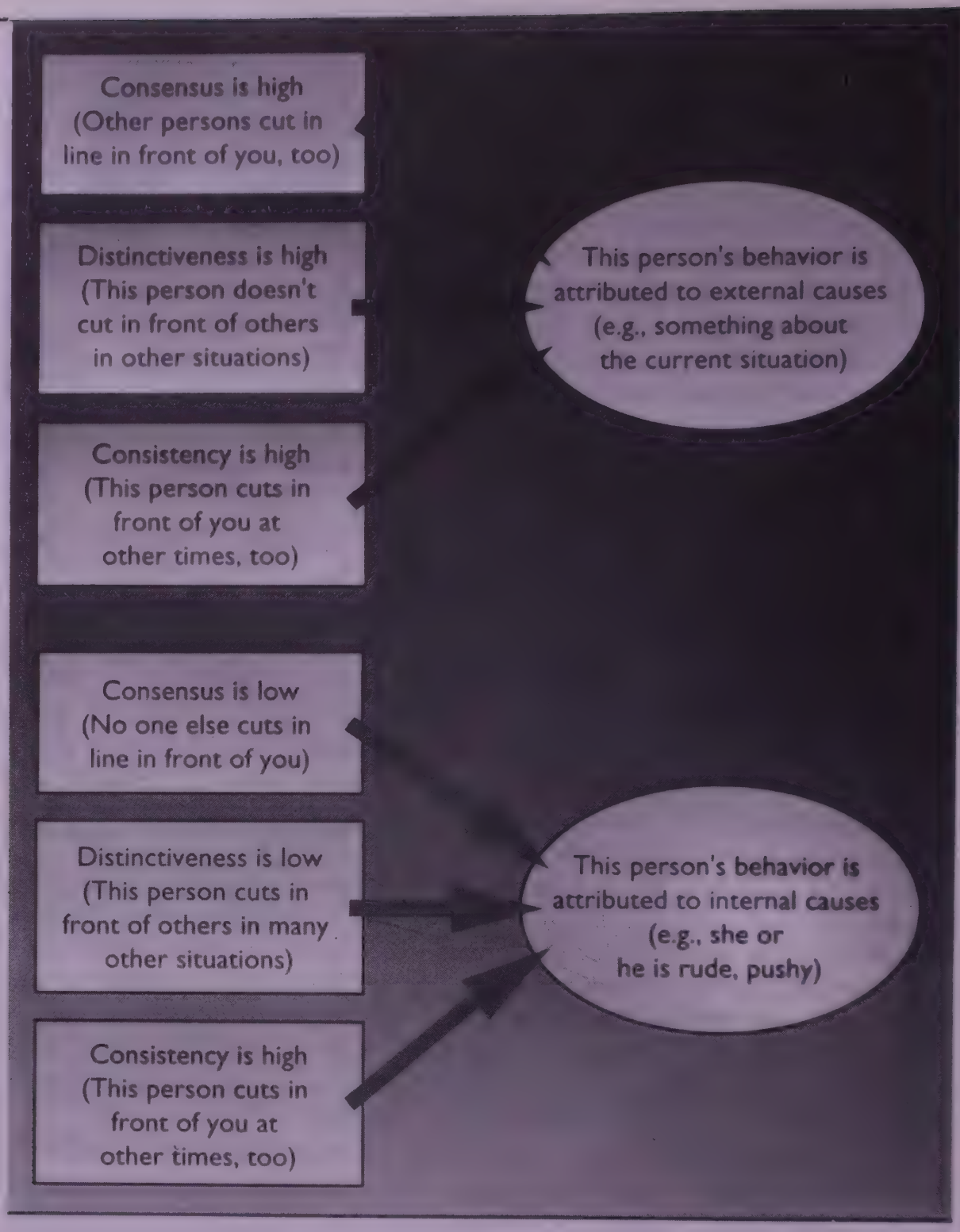
Consistency: *The extent to which a given person responds in the same way to a given stimulus across time.*

Distinctiveness: *The extent to which a given person reacts in the same manner to different stimuli or situations.*

FIGURE 16.1

Kelly's Theory of Causal Attribution: An Overview

Kelley's theory indicates that when consensus, distinctiveness, and consistency are all high, we attribute others' behavior to external causes (upper diagram). When consensus and distinctiveness are low while consistency is high, however, we attribute others' behavior to internal causes (lower diagram).



the fact that you act in ways that seem to *invite* other people to cut in line ahead of you (see Figure 16.1 for a summary of these suggestions).

Do we really think about others and the causes behind their actions in this manner? Performing the kind of analysis described by Kelley requires a lot of effort, and as I've noted repeatedly in this text, people tend to avoid unnecessary cognitive effort. So it's not surprising that studies that have investigated this issue (e.g., Hansen, 1980; Lupfer, Clark, & Hutcherson, 1990), point to the following conclusions: We *do* use the kind of information emphasized by Kelley in situations where we feel that high levels of cognitive effort are justified—primarily in situations where it's important to us to understand why others acted as they did, or when we can't readily explain their actions in terms of what we know about a specific situation or specific persons. In many other cases, however, we don't bother to perform this kind of analysis because, quite simply, it involves too much effort.

ATTRIBUTION: SOME BASIC SOURCES OF BIAS Our discussion so far seems to imply that attribution is a highly rational process in which individuals seek to identify the causes of others' behavior by following orderly cognitive

steps. In general, it is. However, attribution is also subject to several forms of bias—tendencies that can lead us into serious errors concerning the causes of others' behavior. Let's consider several of these.

The fundamental attribution error: Overestimating the role of dispositional causes. Imagine that you witness the following scene: A man arrives at a meeting thirty minutes late. On entering the room he drops his notes on the floor. While attempting to pick them up, he falls over and breaks his glasses. How would you explain these events? Probably by concluding that this person is disorganized, clumsy, and generally inept. In other words, you would emphasize *internal* causes in your explanation. Are such attributions accurate? Perhaps. But it is also possible that the individual was late because of unavoidable delays in traffic, that he dropped his notes because they were printed on extremely slick paper, and that he fell down because the floor had just been waxed and was very slippery. The fact that you would be less likely to mention such *external* potential causes reflects what is often described as the **fundamental attribution error**—our strong tendency to explain others' actions in terms of dispositional (internal) rather than situational (external) causes. In sum, we tend to perceive others as acting as they do because they are "that kind of person" rather than because of situational factors that may well have affected their behavior.

Why do we show this tendency? One explanation suggests that when we observe others' behavior, we focus on their actions rather than on the context in which such actions take place. As a result, we tend to downplay potential situational causes of people's behavior. Another, related possibility is that we do notice situational factors but tend to assign insufficient importance to them (Gilbert & Jones, 1986). Whatever the precise basis for the fundamental attribution error, it has important implications. For example, it suggests that even if individuals are made aware of the situational forces that adversely affect disadvantaged groups in society—forces such as poor diet, disrupted family life, and exposure to lawless and violent peer models—they may still perceive such persons as "bad" and responsible for their own plight. In this respect, the fundamental attribution error can have important social consequences.

Interestingly, our tendency to attribute others' actions to internal causes tends to weaken over time (Burger, 1986; Frank & Gilovich, 1988). In other words, while we tend to attribute someone's action to internal causes soon after it has occurred, we take greater and greater account of situational causes with the passage of time. It seems that over time, the ease of remembering personal information diminishes more rapidly than the ease of remembering situational information. This kind of shift is illustrated clearly by research conducted by Burger and Pavelich (1993).

These investigators examined explanations for the outcome of various U.S. presidential elections printed on the editorial pages of major newspapers (the *New York Times, Wall Street Journal,* and *Christian Science Monitor)* within five days of the elections and much later—two or three years after the elections in question. Their object was to see whether the editorials attributed outcomes to personal characteristics of one or both candidates (internal causes) or to circumstances surrounding the election or events outside the candidates' control (external factors). An example of personal causes is: "Mondale made the outcome worse by the ineptitude of his campaign." An example of situational causes is: "The shadows of Watergate . . . cleared the way for Carter's climb to the presidency." Results were clear: Explanations printed a few days after the election emphasized internal causes; nearly two-thirds mentioned such causes. Two or three years later, however, the opposite was true: Two-thirds of the explanations referred to situational factors. So, over time, the fundamental attribution error does indeed tend to vanish, even in the realm of politics.

Fundamental Attribution Error: *The tendency to attribute behavior to internal causes to a greater extent than is actually justified.*

The self-serving bias: "I can do no wrong; you can do no right." Suppose that you write a term paper for one of your classes. After reading it, your instructor provides very positive feedback. To what will you attribute such success? If you are like most people, the chances are good that you will explain it in terms of *internal* causes—your own talent or the high level of effort you put into preparing the report.

Now, in contrast, imagine that your instructor dislikes the report and criticizes it harshly. How will you explain *this* outcome? Here, it is likely that you will focus mainly on situational causes—the difficulty of the task, the instructor's unrealistically high standards, and so on. In short, you may well show another type of attributional error known as the **self-serving bias** (Miller & Ross, 1975). This is our tendency to take credit for positive behavior or outcomes by attributing them to internal causes, but to blame negative ones on external causes, especially on factors beyond our control (Baumgardner, Hepner, & Arkin, 1986; Brown & Rogers, 1991). Why does this slant in our attributions occur? While several factors may play a role, the most important seem to involve our need to protect and enhance our self-esteem, or the related desire to look good to others (Brown & Rogers, 1991; Greenberg, Pyszczynski, & Solomon, 1982). Attributing our successes to internal causes while attributing failures to external causes permits us to accomplish these ego-protective goals.

Whatever the precise origins of the self-serving bias, it can be the cause of much interpersonal friction. It often leads persons who work with others on a joint task to perceive that *they*, not their partners, have made the major contributions. Similarly, it leads individuals to perceive that while their own successes stem from internal causes and are well deserved, the successes of others stem from external factors and are less appropriate. Also, because of the self-serving bias, many persons tend to perceive negative actions on their part as justified and excusable, but identical actions by others as irrational and inexcusable (Baumeister, Stillwell, & Wotman, 1990). In these ways the self-serving bias can have important effects on interpersonal relations.

KEY POINTS

- According to Kelley, we use information relating to consensus, consistency, and distinctiveness in deciding whether others' actions stem from internal or external causes.
- The fundamental attribution error leads us to overestimate the importance of dispositional causes of others' behavior.
- The self-serving bias leads us to attribute our own positive outcomes to internal causes, but negative ones to external causes.

SOCIAL COGNITION: How We Process Social Information

Identifying the causes behind others' behavior is an important part of social thought; yet it is far from the entire picture. In thinking about other persons, we must also determine which information about them is most important and so worthy of further processing; we must enter this information into long-term memory; we must be able to retrieve it at later times, when needed; and we must be able to combine it in various ways in order to reach various judgments and decisions about others. These tasks are known in social psychology as **social cognition**—the processes through which we notice, interpret, remember, and then use social information (Gilovich, 1990; Ross, 1989).

Self-Serving Bias: *The tendency to attribute positive outcomes to our own traits or characteristics but negative outcomes to factors beyond our control.*

Social Cognition: *The processes through which we notice, interpret, remember, and later use social information.*

Thinking about other persons occupies a considerable portion of our time, and the judgments and conclusions we make about them are of crucial importance in many aspects of our lives. These facts raise an intriguing question: Just how effective *are* we at social cognition—at processing information about others?

The answer provided by research is somewhat mixed. On the one hand, we do seem to be quite efficient in sorting, combining, and remembering a wealth of information about other persons (Fiske & Taylor, 1991). Considering

the amount of input provided by people's words and deeds, this is no simple accomplishment! On the other hand, our social thought is subject to a number of intriguing forms of error. Most of these involve *mental shortcuts*—strategies we use to extract the maximum value from the widest range of information with the least amount of mental effort.

We have already examined some of these shortcuts in chapter 7, where *heuristics* were discussed. As you may recall, these are mental rules of thumb we use for making judgments or decisions very quickly. In this section, therefore, we'll focus on other aspects of social thought—additional tendencies that play important roles in our efforts to make sense out of other people and the social world (Beggan, 1992; Forgas, 1991; Pratto & John, 1991).

Basic Aspects of Social Thought: How We Think about Other Persons Human beings are definitely *not* computers. While we can imagine a person who reasons in a perfectly logical manner, like Mr. Spock of "Star Trek" fame, we are unlikely to ever meet one. Being human, we are fallible where the cognitive side of life is concerned, and social thought is no exception to this rule. Let's consider some of the ways in which social cognition departs from the total rationality of a computer.

The false consensus effect: Availability and the tendency to assume that others think as we do. Be honest: On a scale ranging from 1 (strongly against) to 7 (strongly favor), what is your view about permitting persons with openly homosexual lifestyles to join your nation's military forces? Now, out of one hundred other students at your college, how many do you think share your view, whatever it is? That is, how many are on the same side of the neutral point on this scale (4) as you are? If you are like most people, the number you indicated is higher than what would be revealed by an actual survey. In other words, you assume that people agree with you to a greater extent than is actually true. This tendency is known as the **false consensus effect,** and it occurs in many different contexts. For example, college students tend to overestimate the proportion of other students who agree with their attitudes about drugs, abortion, seat-belt use, university policies, politics, various colors, ethnic foods, and even Ritz crackers or Oreo cookies (Gilovich, 1990; Marks & Miller, 1987; Suls, Wan, & Sanders, 1988). So, though this error is not very large in absolute terms—people don't grossly overestimate the extent to which others agree with them—it does appear to be quite common.

What is the basis for this tendency to assume that others think as we do? Several factors seem to play a role, but the most important involves the *availability heuristic* described in chapter 7. As you may recall, the availability heuristic suggests that the easier it is to bring information to mind, the more important we judge that information to be. Applying this principle to the false consensus effect, it appears that most people find it easier to remember instances in which others have agreed with them than instances in which others have disagreed. As a result, people tend to overestimate the extent to which others share their views (see Figure 16.2 on page 632).

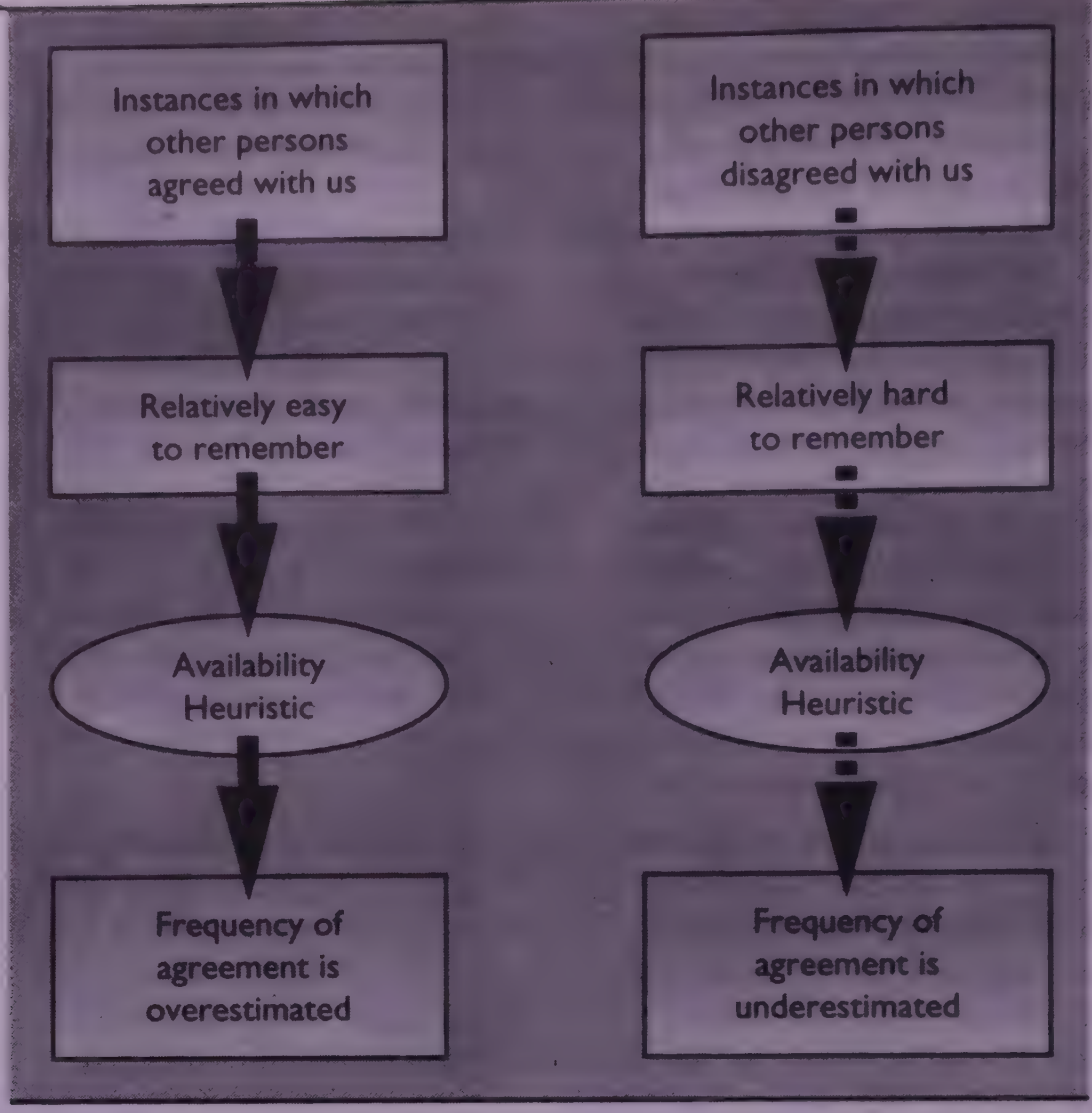
While the false consensus effect is very common, it's also important to note that it does not occur in all situations. Where highly *desirable* attributes are concerned, people wish to perceive themselves as *unique*—more different from others, in a positive direction, than they actually are (Suls & Wan, 1987). As a result, they tend to perceive themselves as happier, more intelligent, more ethical, and less prejudiced than the people around them (Miller & McFarland, 1987). If you'd like to demonstrate this for yourself, just ask ten of your friends to rate themselves on leadership ability; chances are good that almost all will rate themselves as above average on this dimension.

False Consensus Effect: *The tendency to believe that other persons share our attitudes to a greater extent than is true.*

FIGURE 16.2

One Possible Basis for the False Consensus Effect

We often find it easier to remember instances in which others agreed with us than instances in which they disagreed with us. The availability heuristic indicates that the easier it is to remember information, the more weight we attach to it. As a result, we tend to overestimate the extent to which others share our opinions—the *false consensus effect.*



Automatic vigilance: Noticing the negative. Read the following information about someone named Jim:

> Jim, a junior at State U, is a biology major with an A– grade point average. He hopes to enter medical school after graduation. He is a friendly and humorous person, so his friends think that he'll make a great doctor. Jim's hobby is music, and he has a large collection of CDs. He works part time to help pay for his education and to cover the insurance on his car, which is high because of several speeding tickets. Jim grew up in a small town and has one sister who is a junior in high school. He is neat and easygoing, so he never has any trouble getting roommates and is currently living with two other men at his college.

Quick: what piece of information stands out most when you think about Jim? If you said "those speeding tickets," you are reacting like most persons, because in general, we seem to pay much more attention to *negative* information about others than to positive information about them. In fact, it is fair to say that we are *ultrasensitive* to negative social information. If another person smiles at us twenty times during a conversation but frowns once, it is the frown we tend to notice. If one of our friends describes someone to us and mentions fifteen positive things about this individual but one negative thing, *this* is the item on which we focus and the one we tend to remember. So strong is this tendency to pay attention to negative information that some researchers describe it as **automatic vigilance**—a powerful and automatic tendency to pay attention to undesirable information or stimuli (e.g., Shiffrin, 1988).

Automatic Vigilance: *The strong tendency to pay attention to negative social information.*

In an important sense, this tendency is very reasonable. After all, negative information may alert us to potential danger, and it is crucial that we recognize it and respond to it as quickly as possible (Pratto & John, 1991). But our atten-

tional capacity is limited, so when we direct attention to negative social information, we run the risk of overlooking other valuable forms of input. Thus, as is true with all the tendencies in social cognition we will discuss, the automatic vigilance effect is something of a two-edged sword: It may save us cognitive effort, but it can lead us into errors in our perceptions or judgments of others.

One final point: the automatic vigilance effect helps explain why it is often so important to make a good first impression on others. Since people are highly sensitive to negative information, anything we say or do during a first meeting that triggers negative reactions is likely to have a strong effect on the impression we create—much stronger than positive information. In this and many other respects, the automatic vigilance effect can have important effects on key aspects of social thought.

Motivated skepticism: In reaching conclusions, how much information is enough? Suppose that you are listening to a political debate between two candidates. You haven't made up your mind as to which one you'll vote for, but you are leaning toward one because her views seem closer to your own. How much information consistent with your views will it take for you to make up your mind to vote for this candidate? And how does this compare with the amount of information it would require to make you change your mind and switch to the other candidate? If you think about this situation for a moment, you'll probably realize that since you already have a preference for the first candidate, it won't take much to move you firmly into her camp: A relatively small amount of information will suffice. But what about the other candidate? Clearly, this person has a tough job ahead: She or he will have to say a lot of things with which you agree before you reverse your initial preference and decide to vote for this candidate.

This situation illustrates another basic aspect of our social thought: In general, we are skeptical about information that is inconsistent with our initial preferences but quite open to information that supports these views. Put another way, we examine information that supports our preferred conclusions much less carefully—and less skeptically—than information that is inconsistent with what we want to believe or decide. Evidence for this tendency to be more skeptical about information that doesn't support our current views—**motivated skepticism**—is provided by the findings of many studies (e.g., Ditto et al., 1988; Ditto & Lopez, 1992; Kruglanski, 1990). Thus, motivated skepticism appears to be yet another important "tilt" in social cognition. Because of its operation, we tend to require relatively little supporting information to arrive at the conclusions we *want* to reach, but a great deal of disconfirming information to arrive at conclusions opposite to our initial inclinations. This does not mean that we never acknowledge the accuracy or usefulness of information contrary to our preferences; we do accept such input in some cases. But, in general, we seem to possess several kinds of *cognitive filters* that make it more difficult for such input to enter into our social thought and to shape our conclusions. Motivated skepticism is one of these filters. When it operates, the answer to the question "How much information do we require before making a decision?" is "That depends on how closely it matches what we already believe."

Motivated Skepticism: *The tendency to require more information to make a decision contrary to one's initial preferences than a decision consistent with one's initial preferences.*

Counterfactual thinking: The effects of considering "what might have been." Consider the following incidents:

Ms. Caution never picks up hitchhikers. Yesterday, however, she gave a stranger a ride. He robbed her and stole her car.

Ms. Risk frequently picks up hitchhikers. Yesterday, she gave a stranger a ride. He robbed her and stole her car.

Which of these two persons will experience greater regret? Both individuals have had precisely the same outcomes, but if you are like most people, you probably answered, "Ms. Caution will be more upset." Why? The answer involves some intriguing facts about social thought and the judgments and reactions stemming from it. Briefly, our reactions to various events depend not only on the events themselves, but also on what these events bring to mind (Kahneman & Miller, 1986). When we have an experience, we do not only think about the experience itself; we also engage in **counterfactual thinking**—imagining events and outcomes *different* from the ones we actually experienced (Gleicher et al., 1990). In this particular instance, we think, "If only Ms. Caution had not violated her usual rule against picking up hitchhikers, she would have avoided this frightening incident." Alternatively, we may imagine, "If only Ms. Risk had read the papers, she might have realized how dangerous it is to pick up hitchhikers. Then she might have acted differently."

But why does such counterfactual thinking lead us to conclude that Ms. Caution will experience greater regret? In part because it is easier to imagine alternatives to *unusual* forms of behavior than to *usual* or typical forms of behavior. In other words, it requires less mental effort to imagine Ms. Caution driving right by the hitchhiker—her usual behavior—than to imagine Ms. Risk *not* stopping for him—an unusual action for her. So we conclude that Ms. Caution experienced more regret because it is easier to imagine her acting in a different way—sticking to her rule—than it is to imagine Ms. Risk acting differently. After all, Ms. Risk always picks up hitchhikers; it was just her bad luck that it finally caught up with her.

This reasoning about counterfactual thinking leads to the following prediction: Negative outcomes that follow unusual behavior will generate more sympathy for the persons who experience them than negative outcomes that follow usual or typical behavior. This prediction has been confirmed by research findings (e.g., Miller & McFarland, 1987). For example, in one study on counterfactual thinking, Macrae (1992) had two groups of students read different versions of an incident in which a young woman got food poisoning after eating in a restaurant. In one condition the restaurant was one she regularly visited. In the other it was described as her first visit to this particular restaurant; in other words, her behavior in going there was unusual. Participants were then asked to indicate how much compensation the victim should receive and how large a fine the restaurant should pay for its negligence. As shown in Figure 16.3, both amounts were larger in the "unusual behavior" (exceptional) condition than in the "usual behavior" (routine) condition.

In sum, our tendency to imagine events other than those that actually occurred is another important aspect of social cognition. Thinking about "what might have been" may sometimes be just as important in terms of our judgments and conclusions about others as thinking about what *did* occur.

KEY POINTS

- We often believe that others share our views to a greater extent than is actually true; this is the false consensus effect.
- We tend to be especially sensitive to negative social information; this is known as automatic vigilance.
- We tend to be more open to information consistent with our initial preferences than to information inconsistent with these preferences, a tendency known as motivated skepticism.
- When we have an experience, we often imagine events and outcomes that didn't occur. Such counterfactual thinking can affect our interpretation of the experience and our subsequent decisions or judgments based on it.

Counterfactual Thinking: *The tendency to evaluate events by thinking about alternatives to them—"what might have been."*

SOME POSITIVE THOUGHTS ON SOCIAL COGNITION Looking back, this discussion of social cognition seems to paint a fairly bleak picture. In our efforts to make sense out of the social world, it seems, we use many mental shortcuts; and these can often lead us to false conclusions and inaccurate judgments or decisions. While this is certainly true in some instances, growing evidence also supports a somewhat more positive conclusion. The tendencies

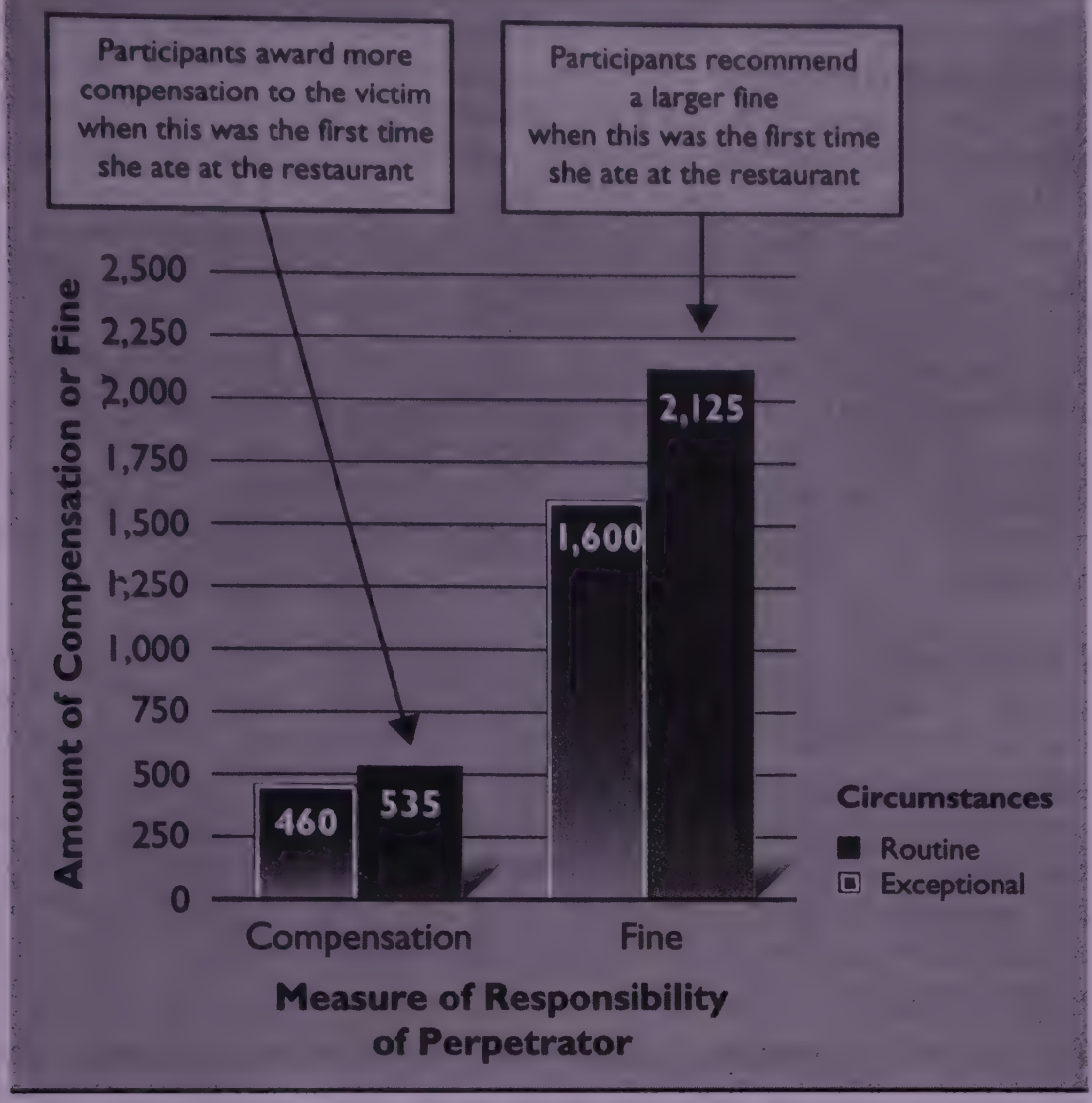


FIGURE 16.3

Counterfactual Thinking in Operation

Research participants indicated that a restaurant that had served tainted food should pay a larger fine to the victim when she had never eaten there before than when she ate there often. This is because when the customer's behavior was unusual, it was easier for participants to imagine a different outcome—one in which she did *not* experience food poisoning. (*Source:* Based on data from Macrae, 1992.)

I've described do sometimes cause us to make errors, but this seems to be the exception rather than the rule. More typically, our mental shortcuts allow us to have our cake and eat it too—to process complex information quickly and efficiently without making serious errors. In this sense, it is useful to view the tendencies and effects we have considered here not as errors, but as useful working compromises we adopt in order to deal with persistent *information overload*—more social input than we can easily handle (Funder, 1987).

ATTITUDES: Evaluating the Social World

Consider the following list:

Bill Clinton
Michael Jackson
2 Live Crew
AIDS
Sharon Stone
pizza

Do you have any reactions to each item? Unless you have been living a life of total isolation, you probably do. You may like or dislike President Clinton, be very worried or unconcerned about the spread of AIDS, and find Sharon Stone attractive or unattractive. At one time or other you have probably thought about every item on this list and have developed feelings and beliefs about them. Together, such reactions are generally known as **attitudes**—mental representations and evaluations of various aspects of the social world (Judd et al., 1991).

Attitudes: *Mental representations and evaluations of features of the social or physical world.*

PERSUASION IN ACTION

Efforts to change attitudes and behavior through persuasion are all around us.

Attitudes are formed through basic processes of learning we considered in chapter 5. For example, they often stem from *operant conditioning*, since we are frequently rewarded by our parents, teachers, or friends for expressing the "correct views"—the ones *they* hold. Similarly, attitudes also derive from *observational learning*. Throughout life, we tend to emulate the views and preferences expressed by people we like or respect simply because we are exposed to these views. Even *classical conditioning* plays a role; it may be especially influential in shaping the *emotional*, or *affective*, aspect of attitudes (e.g., Betz & Krosnick, 1993; Krosnick et al., 1992).

Whatever their precise origins, attitudes are an important aspect of social thought and have long been the subject of systematic study by social psychologists. In this discussion we'll focus on certain key aspects of attitudes: *persuasion*—how attitudes can sometimes be changed; and *cognitive dissonance*—a process through which we sometimes actually seem to change our attitudes.

PERSUASION: THE PROCESS OF CHANGING ATTITUDES As the twentieth century draws to a close, the business of changing attitudes—or at least trying to change them—seems to grow ever more intense. Television commercials, magazine ads, giant billboards, political campaigns, public service announcements urging people to wear seat belts, stop smoking, or exercise—the messages and media vary, but the goal remains the same: to change people's attitudes and so, ultimately, their behavior. To what extent are such efforts at **persuasion** effective? And what factors determine whether and to what extent persuasion succeeds?

Persuasion: The traditional approach. In most cases, efforts at persuasion involve the following basic elements: Some *source* directs some type of *message*, or communication, to some target *audience*. Early research on persuasion, therefore, focused on these basic components. It addressed various aspects of the question "*Who* says *what* to *whom* and with what *effect?*" (Hovland, Janis, & Kelley, 1953). The findings of such research were complex, but among the most important were these:

1. Experts are more persuasive than nonexperts (Hovland & Weiss, 1951).
2. Messages that do not appear to be designed to change our attitudes are often more successful than ones that seem intended to manipulate us (Walster & Festinger, 1962).
3. Popular and attractive sources are more effective in changing attitudes than unpopular or unattractive ones (Kiesler & Kiesler, 1969).
4. Persons who are relatively low in self-esteem are often easier to persuade than persons high in self-esteem (Janis, 1954).
5. When an audience holds attitudes contrary to those of a would-be persuader, it is often more effective to adopt a *two-sided approach*, in which both sides of an issue are presented, rather than a *one-sided approach*, in which only one is described. When members of an audience hold attitudes consistent with those of a would-be persuader, however, a one-sided approach is often more effective.
6. As we saw in chapter 1, people who speak rapidly are generally more persuasive than ones who speak slowly (Miller et al., 1976), partly because they seem more competent—and confident.

Persuasion: *The process through which one or more persons attempt to alter the attitudes of one or more others.*

One word of caution: changing attitudes is a complex and tricky business. Many different factors play a role, including all of those listed above and oth-

ers as well. Moreover, these variables can and often do interact with one another. For this reason, simple generalizations about persuasion are risky at best. However, the findings reported above have generally withstood the test of time and additional research, so they appear to represent useful basic principles. As such, they constitute an important part of our knowledge about the process of persuasion.

Persuasion: The cognitive approach. The traditional approach to understanding persuasion has certainly been useful; it provided a wealth of information about the "who" and the "how" of persuasion. This approach was less helpful, however, in terms of answering the question "why"—why do people change their attitudes in response to persuasive messages?

This issue has been brought into sharp focus in a more modern approach to understanding persuasion known as the **cognitive perspective on persuasion** (Petty & Cacioppo, 1986). This cognitive perspective focuses on the following question: What cognitive processes determine when someone is actually persuaded? In other words, this newer perspective seeks to understand (1) what people think about when they are exposed to persuasive appeals, and (2) how these thoughts and cognitive processes determine whether, and to what extent, attitude change occurs.

One theory that adopts this perspective is known as the **elaboration likelihood model (ELM)** (Petty & Cacioppo, 1986). According to this model, when individuals receive a persuasive message, they think about it, the arguments it makes, and (perhaps) the arguments it has left out. It is these thoughts—not the message itself—that then lead either to attitude change or to resistance. The model also suggests that persuasion can take place through different processes. When persuasive messages deal with issues that are important or personally relevant to recipients, these persons are likely to devote careful attention to the message and the arguments it contains. In that case, persuasion occurs through what is known as the **central route**—which includes such activities as evaluating the strength or rationality of the argument and deciding whether its content agrees or disagrees with current beliefs. When messages are processed via this central route, attitude change will occur only to the extent that the arguments presented are convincing and the facts marshaled on their behalf are strong.

In contrast, when messages deal with issues that are relatively unimportant and not personally relevant to recipients, persuasion occurs through the **peripheral route**. Here, little cognitive work is performed, and attitude change, when it takes place, involves a seemingly automatic response to *persuasion cues*—information relating to the source's prestige, credibility, or likability, or to the style or form of the message the would-be persuader presents. Attitude change is more likely to occur through the peripheral route when audience members are distracted and can't engage in a careful analysis of the speaker's message (see Figure 16.4 on page 638).

A growing body of evidence indicates that the ELM analysis is accurate (e.g., DeBono, 1992; Roskos-Ewoldsen & Fazio, 1992). In any case, the cognitive perspective it represents has certainly added much to our understanding of persuasion. As a result of this approach, we now know more than merely when persuasion is likely to occur; in addition, we are beginning to understand *why* this process actually takes place.

Cognitive Perspective on Persuasion: *An approach that seeks to understand persuasion by identifying the cognitive processes that play a role in it.*

Elaboration Likelihood Model *(of persuasion): A theory suggesting that there are two distinct routes to persuasion involving different amounts of cognitive elaboration in response to a persuasive message.*

Central Route *(to persuasion): Attitude change resulting from systematic processing of information contained in persuasive messages.*

Peripheral Route *(to persuasion): Attitude change resulting from peripheral persuasion cues—information concerning the expertise, status, or attractiveness of would-be persuaders.*

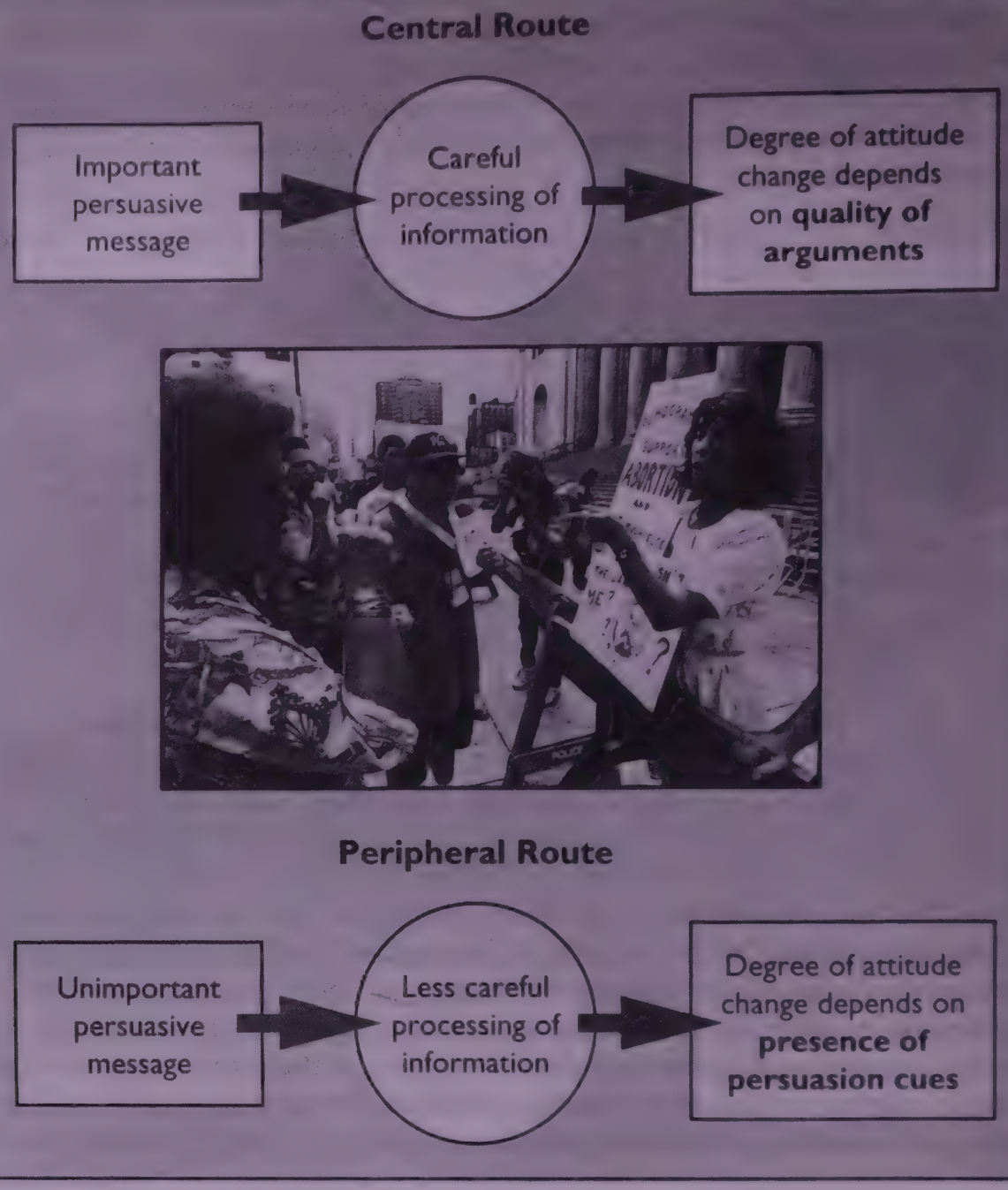
Cognitive Dissonance: How We Sometimes Change Our Attitudes

There are many occasions in everyday life when we feel compelled to say or do things inconsistent with our true attitudes. Here are two examples of these occasions:

FIGURE 16.4

The Elaboration Likelihood Model: An Overview

According to the ELM, persuasion can occur through two different processes. If persuasive messages are important or personally relevant to us, we pay careful attention to the arguments, and persuasion can occur through the *central route*. If we find messages unimportant or irrelevant, however, persuasion occurs through the *peripheral route*, largely in response to *persuasion cues*.
(*Source:* Based on suggestions by Petty & Cacioppo, 1986.)



Your friend buys a car and proudly asks how you like it. You have just read an article indicating that this model is such a lemon that the manufacturer puts a ten-pound bag of sugar in the trunk. What do you say?

You are writing a term paper, and your professor has given you one of his own articles to read. You found it murky beyond belief. Later he asks you, "How did you like my paper?" What do you answer?

Unless you are an especially courageous (foolhardy?) person, the chances are good that in these situations, and many others like them, you will say the polite thing: You will tell your friend that you like the car and will comment favorably on the professor's article. The reasons for doing so are so obvious that social psychologists describe such situations as ones involving **forced compliance**—situations where we practically feel compelled to say or do things inconsistent with our true attitudes. Does forced compliance have any effect on our underlying attitudes? According to a theory known as *cognitive dissonance*, it may (Festinger, 1957).

Forced Compliance: A situation in which we feel compelled to say or do things inconsistent with our true attitudes.

Cognitive Dissonance: The state experienced by individuals when they discover inconsistency between two attitudes they hold or between their attitudes and their behavior.

The term **cognitive dissonance** refers to the unpleasant state we experience in such situations—discomfort stemming from an obvious gap between our attitudes and our actions, or between two attitudes that we hold (see

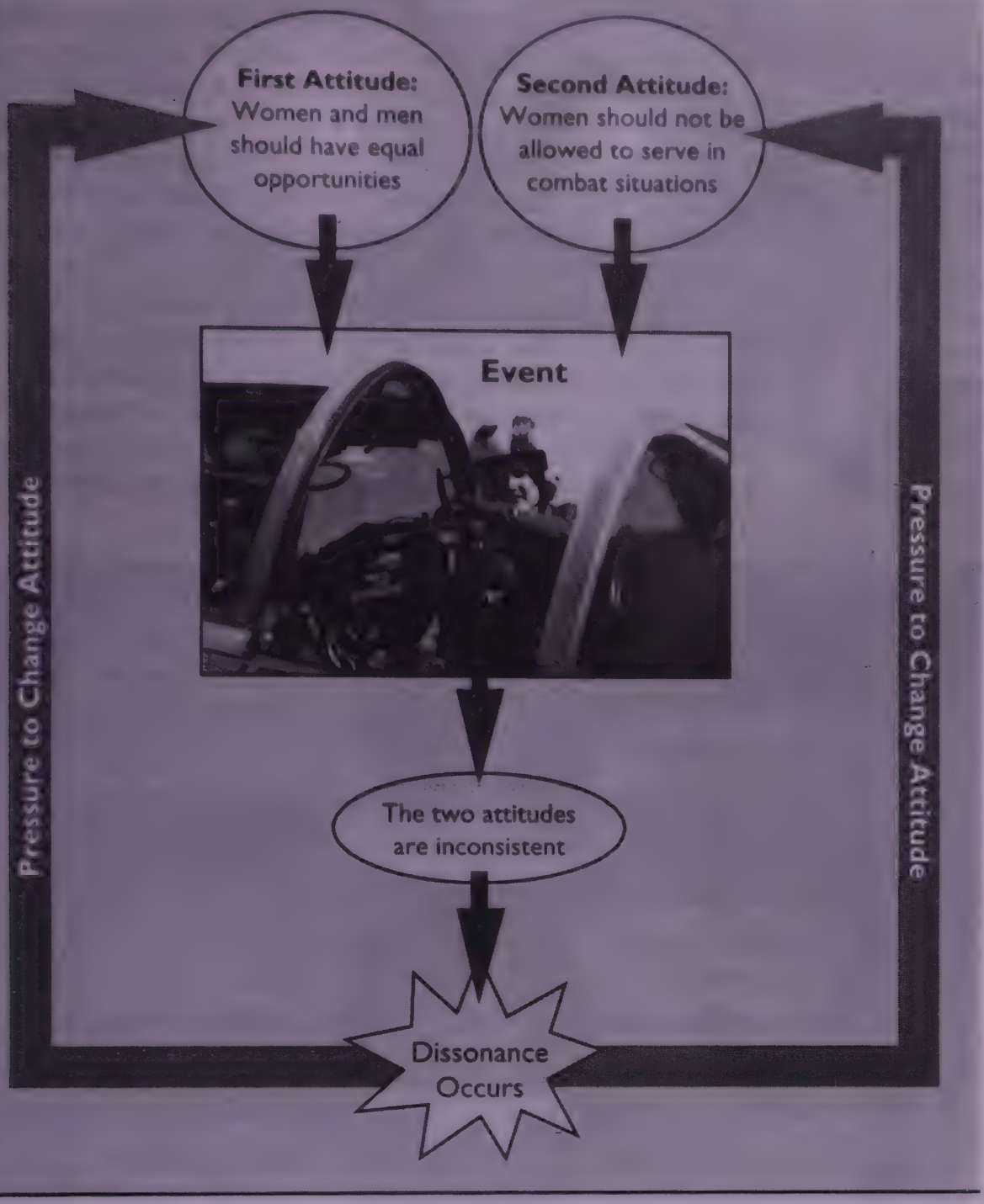


FIGURE 16.5

Cognitive Dissonance

When people notice that two attitudes they hold are somehow inconsistent, they may experience *cognitive dissonance*—an unpleasant motivational state. In order to reduce cognitive dissonance, individuals may change one or both of the inconsistent attitudes.

Figure 16.5). Such dissonance, the theory holds, is a *motivational state:* People experiencing it want to reduce it. How do they accomplish this goal? Several possibilities exist, such as minimizing the importance of the inconsistency in question; but by far the most intriguing is this: *persons experiencing dissonance because they have said or done something inconsistent with their attitudes may experience change in these attitudes, because this helps to reduce dissonance.* In short, after praising your friend's lemon or your professor's jargon-studded paper, you may actually develop more favorable attitudes toward these items. Doing so helps to reduce dissonance, which, as I noted earlier, is an uncomfortable state.

Dissonance and the less-leads-to-more effect. This prediction—that people sometimes change their own attitudes—is surprising enough. But according to dissonance theory, there is more to the process than this. In any situation where people say or do things inconsistent with their own views, we must consider another factor: How strong

KEY POINTS

- Attitudes play an important role in many aspects of social thought.
- Early research on persuasion focused primarily on how aspects of the source, the message, and the audience influence persuasion.
- Modern cognitive models of persuasion, such as the elaboration likelihood model, emphasize the role of cognitive processes.

(continued)

Key Points

- When individuals notice that attitudes they hold or their attitudes and their behavior are somehow inconsistent, they experience cognitive dissonance, a state that can cause them to change their attitudes.
- Providing individuals with small rewards for expressing views they don't really hold—forced compliance—sometimes leads to greater attitude change than providing them with relatively large rewards.

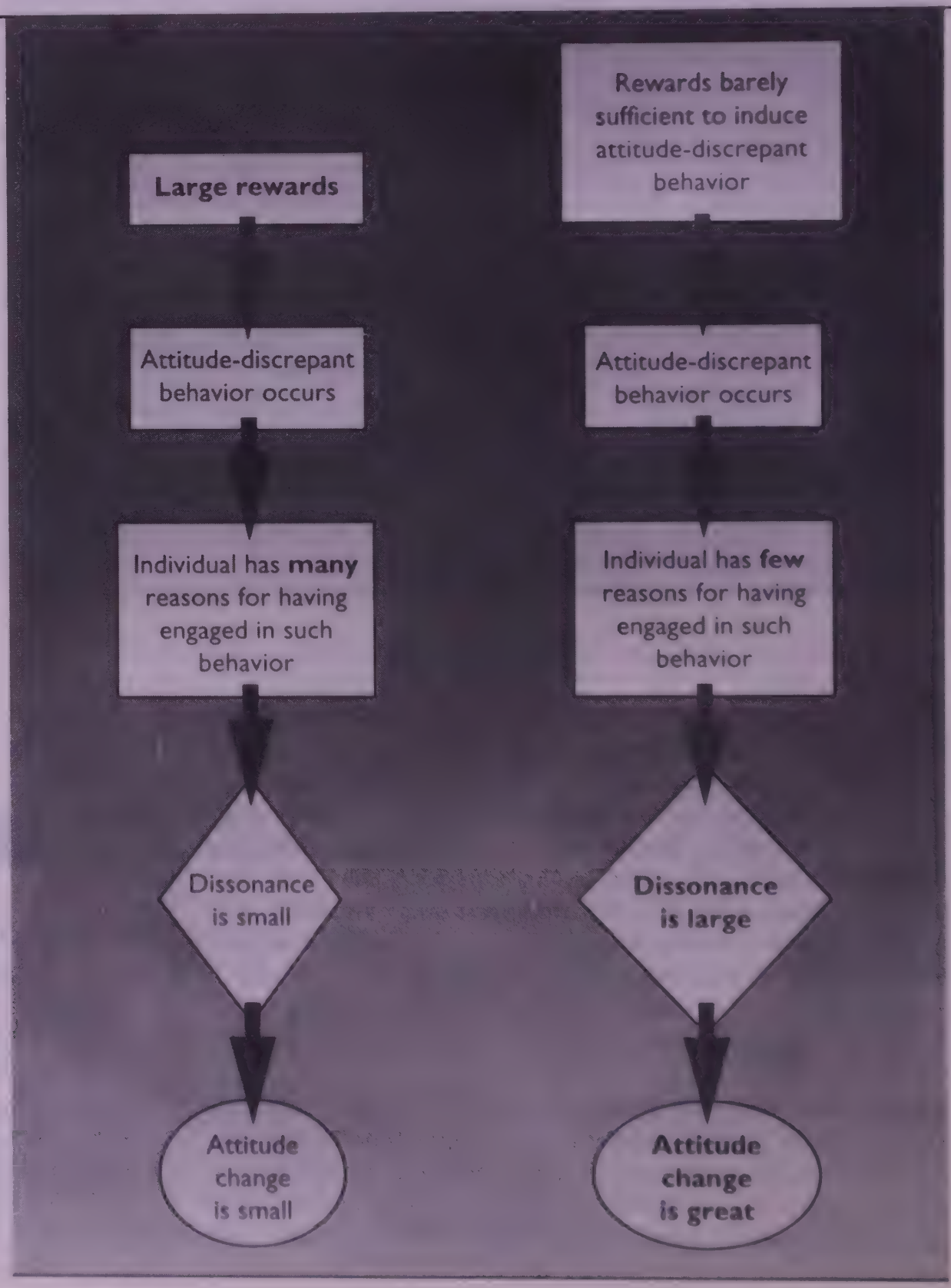
are the reasons for behaving in these ways? If these reasons are very good, then little or no dissonance will be generated. After all, telling your friend that his new car is a lemon or telling your professor that his paper was boring and muddled may prove very costly in terms of embarrassment and in other respects. So, in short, the better the reasons for saying what you don't believe, the less dissonance you will experience, and the weaker the pressure to change your own views.

Social psychologists describe this paradoxical state of affairs as the **less-leads-to-more effect:** the fact that the stronger the reasons for engaging in attitude-discrepant behavior, the weaker the pressures toward changing the underlying attitudes (see Figure 16.6), and vice versa. Surprising as it may seem, this effect has been confirmed in

Figure 16.6

Rewards and Forced Compliance: Why Less Sometimes Leads to More

When individuals receive *large* rewards for engaging in attitude-discrepant behavior, they experience little or no dissonance. Thus, there is little pressure for them to change their attitudes (shown on the left). In contrast, when individuals receive *small* rewards for engaging in attitude-discrepant behavior (ones just barely sufficient to induce them to perform such actions), they experience much greater dissonance and much greater pressure to change their attitudes (shown on the right). In short, less (smaller rewards) can really be more (produce more attitude change) in such situations.



Less-Leads-to-More Effect: *The fact that rewards just barely sufficient to induce individuals to state positions contrary to their own views often generate more attitude change than larger rewards.*

many different studies (e.g., Riess & Schlenker, 1977). In all these investigations, people provided with a small reward for stating attitudes contrary to their own views changed these attitudes so that they later became closer to the false views they expressed.

The less-leads-to-more effect doesn't occur in all cases, however. In order for it to take place, people must feel that they had a choice as to whether to perform the attitude-discrepant behavior and must believe that they were personally responsible both for the chosen course of action and any negative effects it produced (Cooper & Scher, 1990; Goethals, Cooper, & Naficy, 1979). When these conditions exist—and they often do—then the less-leads-to-more effect occurs, and offering individuals small rewards for saying or doing what they don't believe will produce greater attitude change than offering them larger rewards.

For information on practical uses of dissonance theory, please see the **Point of It All** section below.

The Point of It All

Practical Uses of Dissonance Theory: Hypocrisy and the Alteration of Societally Important Attitudes

Most efforts to alter our attitudes stem from selfish motives—someone's desire to sell us something, win our vote, and so on. But others derive from more socially beneficial goals. For example, public service organizations attempt to change our attitudes toward various health practices such as quitting smoking, practicing safe sex, and avoiding too much sun. There's no direct gain to these organizations if they succeed; they merely wish to improve the health and well-being of their target audiences. A very practical question arises in connection with such campaigns: Since people are so good at resisting persuasion, how can the effectiveness of these beneficial efforts to change attitudes be enhanced? Research by Aronson and his colleagues (e.g., Aronson, 1992; Stone et al., 1994) suggests that techniques based on dissonance theory may be very helpful in this regard.

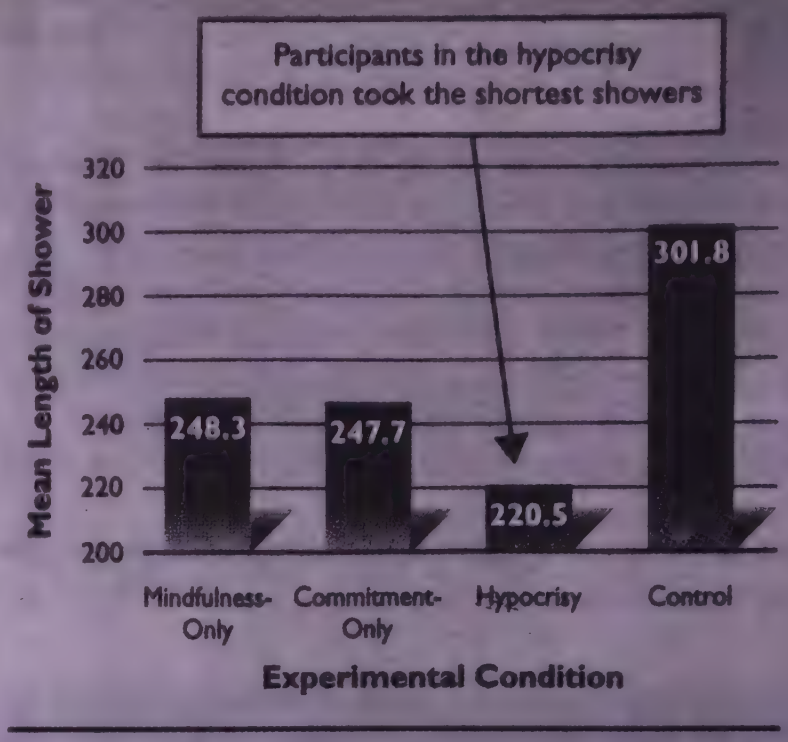
Since most people already agree with such views as "Smoking can be harmful to your health" and "Too much sun can cause permanent harm to your skin," forced compliance doesn't seem to be directly applicable. Instead, Aronson and his colleagues recommend an approach based on forcing people to recognize the gap between their stated attitudes and their behavior—a gap often referred to as *hypocrisy*. Presumably, when people become aware of the gap between what they practice and what they preach, strong pressures to eliminate this gap—to bring their behavior into line with their attitudes—are generated. As an example of research employing these tactics, let's consider a study concerned with water conservation—one important environmental issue (Dickerson et al., 1992).

This experiment was conducted in California in the early 1990s, a time when that state was experiencing a severe drought. The researchers approached female college athletes (swimmers) who were about to take a shower. One group (those in the *commitment-only* condition) were asked to endorse a flyer reading "Please conserve water. Take shorter showers. Turn showers off while soaping up." A second group (the *mindfulness-only* condition) were asked to answer questions about their own showering activities, such as "When showering, do you always turn off the water while soaping up or shampooing?" These

FIGURE 16.7

Dissonance, Hypocrisy, and Attitude Change

Participants who both endorsed water-saving actions and answered questions about their own behavior (the *hypocrisy* condition) actually took shorter showers than persons who merely endorsed the flyer (*commitment-only* condition) or who merely answered questions about their behavior (*mindfulness-only* condition). These findings indicate that dissonance, induced by making people aware of their own hypocrisy, can be a powerful technique for changing socially important attitudes and behavior.
(*Source*: Based on data from Dickerson et al., 1992.)



questions were designed to remind participants about their own past failures to conserve water. A third group (the *hypocrisy* condition) was asked both to answer the questions *and* to sign the flyer. This group, of course, was expected to experience the strongest feelings of hypocrisy. Finally, persons in a fourth group (*control* condition) were not asked to perform either action. A female experimenter was present in the shower room and actually timed the length of showers taken by participants. It was predicted that those in the hypocrisy condition would take the shortest showers. And, as shown in Figure 16.7, this was precisely what happened.

The findings of this study, plus several others, indicate that dissonance can indeed be an effective means for changing attitudes and behavior. Further, it is not necessary to induce people to engage in actions contrary to their own attitudes for such effects to occur; merely being reminded of the gap between one's attitudes and one's behavior can be effective in this regard. In short, individuals can sometimes change their own attitudes by saying and doing things they *believe*, as well as by saying or doing things they *don't* believe.

SOCIAL BEHAVIOR: Interacting with Others

Thinking about other people is an important aspect of our social existence; but as you know from your own life, we also *interact* with others in many ways. We work with them on various tasks; we offer them assistance and receive help from them; we attempt to influence others and are on the receiving end of *their* efforts at influence; we fall in and out of love, form and end relationships—the list is almost endless.

In this section, we'll look at several important aspects of *social interaction*. We'll begin with a topic that could readily have been placed either here or in our discussion of social thought: *prejudice*, or negative views of specific social

groups that often lead to harmful actions against them. Next, we'll consider *social influence:* the many ways in which individuals seek to change the behavior of others. Then, we'll turn to *prosocial behavior*—actions that benefit others. Finally, we'll examine three closely related topics that play a key role in everyone's life: *attraction, love,* and *close relationships.*

PREJUDICE: Distorted Views of the Social World . . . and Their Consequences

"Ethnic cleansing" in Bosnia; racially motivated violence in South Africa, the United States, and many other countries; bombings in Northern Ireland—every day seems to bring new evidence of the tragic consequences of racial, ethnic, or religious hatred. Such actions often stem from **prejudice**—negative attitudes toward the members of a specific social group based solely on their membership in that group. Where do such attitudes come from? And what can be done to reduce their impact on behavior? These are the issues we'll now examine (Dovidio & Gaertner, 1986).

THE ORIGINS OF PREJUDICE: CONTRASTING PERSPECTIVES Many different explanations for the origins of prejudice have been proposed. Here, I'll touch on the four that have received the most attention.

Direct intergroup conflict: Competition as a source of bias. It is sad but true that many of the things we value most—a good job, a nice home, high status—are always in short supply; there's never quite enough to go around. This fact serves as the basis for what is perhaps the oldest explanation of prejudice—**realistic conflict theory**. According to this view, prejudice stems from competition between social groups over valued commodities or opportunities. The theory further suggests that as such competition persists, the members of the groups involved come to view each other in increasingly negative ways (White, 1977). They label the people in the other group as enemies, view their own group as morally superior, and draw the boundaries between themselves and their opponents more and more firmly. In short, what starts out as economic competition gradually turns into full-scale prejudice, with the hatred and anger this usually implies.

Please don't misunderstand: The fact that conflict between groups *can* be a source of prejudice doesn't mean that this is always the case. However, it does seem to be true that groups in competition with one another tend to perceive each other in increasingly negative ways, so that such competition is often the starting point for the development of prejudice.

The us-versus-them effect: Social categorization as a basis for prejudice. A second perspective on the origins of prejudice begins with a basic fact: individuals generally divide the social world into two distinct categories—*us* and *them* (Turner et al., 1987). They view other persons as belonging either to their own social group, usually termed the *ingroup,* or to another group, an *outgroup.* Such distinctions involve many dimensions, including race, religion, sex, age, ethnic background, occupation, and even the town or neighborhood in which people happen to live.

If this process of **social categorization**—dividing the world into distinct social categories—stopped there, it would have little connection to prejudice. Unfortunately, it does not. Sharply contrasting feelings and beliefs are usually attached to members of one's ingroup and members of various outgroups. Persons in the former (us) category are viewed in largely favorable terms,

Prejudice: *Negative attitudes toward the members of some social group based on their membership in this group.*

Realistic Conflict Theory: *A theory proposing that prejudice stems, at least in part, from economic competition between social groups.*

Social Categorization: *Our tendency to divide the social world into two distinct categories: "us" and "them."*

THE MASS MEDIA AND PREJUDICE

Children seeing these two media portrayals of African Americans would obtain sharply contrasting views.

while those in the latter (them) category are perceived negatively. Outgroup members are assumed to possess undesirable traits, are perceived as being "all alike" to a greater degree than members of one's own ingroup, and are often strongly disliked (Judd, Ryan, & Park, 1991; Linville, Fischer, & Salovey, 1989). Because of such tendencies (e.g., Tajfel, 1982), categorizing the social world into distinct ingroups and outgroups can be an important basis for prejudice.

The role of social learning. A third perspective on the origins of prejudice begins with the obvious fact that infants do *not* show such reactions. This suggests that children acquire negative reactions to others as they grow older through the process of *social learning*. Prejudice emerges out of experiences in which children hear or observe their parents, friends, teachers, and others expressing prejudiced views; or because they are directly rewarded, with praise and approval, for adopting them.

While persons with whom children interact certainly play a key role in this process, the mass media, too, are important. What kind of views about African Americans would children obtain from the media portrayals illustrated above? Obviously, very different ones. Where acquisition of prejudiced views is concerned, the impact of many hours of television viewing should not be overlooked.

Cognitive sources of prejudice: The role of stereotypes. The final potential source of prejudice we'll consider is in some ways the most unsettling of all. It involves the possibility that prejudice stems at least in part from basic aspects of social thought itself—from basic ways in which we think about others and process social information (Bodenhausen, 1988). While several processes may play an important role, perhaps the most important of these involves the formation and impact of **stereotypes** (e.g., Bodenhausen, 1988; Devine, 1989; Gilbert & Hixon, 1991).

Stereotypes are cognitive frameworks consisting of knowledge and beliefs about specific social groups—frameworks suggesting that by and large, all members of these groups possess certain traits (Judd, Ryan, & Park, 1991). Like other cognitive frameworks, or schemas, stereotypes exert strong effects on the ways in which we process social information. For example, information relevant to a particular stereotype is processed more quickly than information unrelated to it (Dovidio, Evans, & Tyler, 1986). Similarly, stereotypes lead us to pay attention to specific types of information—usually information consistent with the stereotypes. And they may actually block our ability to pay attention to stereotype-inconsistent information (Sanbonmatsu, Akimoto, & Gibson, 1994). Finally, stereotypes also determine what we remember—usually, again, information that is consistent with these frameworks (Seta & Hayes, 1994).

Stereotypes: *Cognitive frameworks suggesting that all members of specific social groups share certain characteristics.*

What is the relevance of such effects to prejudice? Together, they tend to make stereotypes somewhat self-confirming. Once an individual has acquired a stereotype about some social group, she or he tends to notice information that fits readily into this cognitive framework and to remember "facts" that are consistent with it more readily than "facts" inconsistent with it. As a result, the stereotype strengthens with time. Indeed, even exceptions to it tend to make it stronger, for they simply induce the persons holding the stereotype to bring more supporting information to mind. In short, our tendency to create cognitive frameworks to hold and organize social information may contribute to the development and persistence of many forms of prejudice.

Challenging Prejudice: Some Potential Plans of Action Whatever the precise roots of prejudice, there can be no doubt about one fact: It is a brutal—and brutalizing—force. Reducing prejudice and countering its impact, therefore, are important tasks. Fortunately there are some effective strategies for combating prejudice. None is capable of totally eliminating prejudice, but together, they *can* help.

Breaking the cycle of prejudice: Learning not to hate. Bigots are made, not born. Children acquire negative attitudes toward specific social groups from their parents, friends, teachers, and others. Given this basic fact, one useful way to reduce prejudice would be to discourage the transmission of bigoted views and to encourage more positive attitudes toward others. But how can we encourage parents who are themselves highly prejudiced to change the message they transmit to their youngsters from "People in those groups are *bad*" to "People should be judged on their own merits—not on the basis of the groups to which they belong"? One possibility involves calling parents' and others' attention to their own prejudiced views. Few persons are willing to describe themselves as prejudiced. Instead, they view *their* negative attitudes toward others as justified. A key initial step, therefore, is convincing parents that the problem exists. Once they realize that it does, many are willing to modify their words and actions. True, some die-hard bigots *want* to turn their children into hate-filled fanatics. Most people, however, genuinely wish to provide their children with a more positive view of the social world. Thus, campaigns designed to enhance parents' awareness of prejudice and its harmful effects can sometimes yield desirable results (Aronson, 1990).

Schools and teachers, too, can play a positive role. By calling attention to the existence—and evils—of prejudice, they can help increase children's awareness of this problem. And where prejudice is concerned, awareness of the problem is often a crucial first step toward its elimination.

Direct intergroup contact: The potential benefits of becoming acquainted. Prejudice tends to build social walls between people. Once it exists, members of different ethnic, racial, or religious groups have restricted contact with one another. Such limited contact, in turn, makes it easier for stereotypes to persist. Can this pattern be broken by direct intergroup contact? The **contact hypothesis** suggests that it can (Stephan, 1987). According to this hypothesis, increased contact between members of various groups can be effective in reducing prejudice, provided that it occurs under the following conditions:

1. The groups that interact are roughly equal in social, economic, or task-related status.
2. The contact situation involves cooperation and interdependence so that the groups work toward shared goals.
3. Contact between the groups is informal, so they can get to know one another on a one-to-one basis.

Contact Hypothesis: *The suggestion that increased contact between members of different social groups will reduce prejudice between them.*

4. Contact occurs in a setting where existing norms favor group equality.
5. The persons involved view one another as typical members of their respective groups.

When contact between initially hostile groups occurs under these conditions, prejudice between them does seem to decrease (Cook, 1985). For example, increased contact between Jews of Middle Eastern origin and Jews of European or American origin has been found to reduce ingroup bias among Israeli soldiers (Schwarzwald, Amir, & Crain, 1992). Similarly, increased contact between African Americans and whites has been found to reduce prejudice between them in the United States (Aronson, Bridgeman, & Geffner, 1978). Thus, increased social contact, under appropriate conditions, offers another useful means for reducing prejudice.

Recategorization: Redrawing the boundary between "us" and "them." Suppose that a team from your college played against a team from a rival college: Which would be "us" and which would be "them"? The answer is obvious: Your own school's team would constitute your ingroup, while the other school's team would be the outgroup. But now imagine that the team from the other school had won a whole series of games and was chosen to represent your state in a national tournament. When it played against a team from another state, would you now perceive it as "us" or "them"? Under these circumstances, many people would shift to viewing the other school's team as their ingroup. This suggests that the boundary between "us" and "them" is not fixed or inflexible. On the contrary, it can be shifted so as to include—or exclude—various groups of people. Can such a shift or **recategorization** of the social world be used to reduce prejudice in other contexts? Studies conducted by Gaertner and his colleagues (1989, 1990) suggest that it can.

For example, in one of these projects, Gaertner and his coworkers (Gaertner et al., 1993) investigated the attitudes of students at a multicultural high school in the United States. Students came from many different backgrounds—African-American, Chinese, Hispanic, Japanese, Korean, Vietnamese, and Caucasian. More than thirteen hundred young people completed a survey designed to measure their perceptions of the extent to which the student body at the school was a single group, consisted of distinct groups, or was composed of separate individuals. Results offered strong support for the view that redrawing the boundaries between "us" and "them" can have very beneficial effects. The stronger participants' belief that the student body was a single integrated group, the stronger their perception that students from all groups worked well together, and the more positive their feelings toward students from ethnic groups other than their own. Indeed, the stronger the students' beliefs that they all belonged to one group, the smaller the difference between their feelings about members of their own ethnic group (ingroup) and their feelings about other ethnic groups (outgroups). When combined with the results of systematic laboratory studies (Gaertner et al., 1989, 1990), these findings suggest that efforts to induce persons belonging to different groups to engage in recategorization can be an important first step toward reducing many forms of prejudice.

What are the effects of prejudice on groups who are its victims? For information on this important question, please see the following **Perspectives on Diversity** section.

RECATEGORIZATION: THE BOUNDARY BETWEEN "US" AND "THEM"

The greater the extent to which students at a multicultural school perceive themselves as part of a single group, the more positive their feelings toward other students outside their own cultural group.

KEY POINTS

- Prejudice, negative attitudes toward members of specific social groups, may arise out of economic competition between groups, social categorization, social learning, and cognitive factors such as stereotypes.
- Prejudice can be reduced by socialization of children to be tolerant, increased contact between groups, and recategorization—changing the boundaries between ingroups and outgroups.

Recategorization: *Shifting the boundary between "us" and "them" so that persons previously seen as belonging to outgroups are now seen as belonging to the ingroup.*

PERSPECTIVES ON DIVERSITY

The Effects of Prejudice: Racial Identification among African Americans

Many of the effects of prejudice on the groups toward whom it is directed are obvious: exclusion from jobs, housing, and schools; second-class treatment by the courts and other public institutions; stereotyping in the mass media; and, of course, senseless acts of violence. In addition to these effects, however, there are others that, while more subtle in form, may be equally important in their impact. These effects relate to the *reactions* of victims of prejudice to their mistreatment. What does prejudice do to their self-concept, their self-esteem, and their identification with their own group? How do they cope with prejudice—with being "outsiders" in their own society?

The idea of investigating such questions is far from new. Indeed, classic studies of the effects of prejudice on the self-concept of African Americans were conducted by the famous black psychologist Kenneth Clark in the 1940s (e.g., Clark & Clark, 1947). After this early work, however, the issue of reactions to prejudice on the part of its victims was largely neglected; it has reappeared—in much more sophisticated form—only in the past decade (McMillan, 1988). Since much of this work has focused on the reactions of African Americans to racial prejudice, we'll emphasize this topic here. But investigations of the reactions to prejudice of other minority groups is equally important and is currently proceeding.

While racial prejudice can potentially influence its victims in many different ways, one that seems especially important involves **racial identification**—the extent to which African Americans (or members of any other racial minority) are conscious of belonging to a specific racial group. That such feelings are indeed part of the experience of many African Americans seems obvious (e.g., Asante, 1980; Williams, 1976). But what, precisely, does racial identification involve? Does it consist of distinct components? And what factors affect it? Systematic research has begun to address all of these issues (e.g., Hilliard, 1985).

In what is perhaps the most influential current model of racial identification, Sanders Thompson (1991), a noted African-American researcher, suggests that racial identification among African Americans involves three components: *physical, psychological,* and *sociocultural.*

The physical component refers to a sense of acceptance and comfort with the physical attributes of blacks (skin color, hair texture, and so on). The psychological component refers to the individual's sense of concern and commitment to the racial group. Group pride and feelings of group membership are central to this aspect of racial identity. Finally, the sociocultural aspect refers to individuals' attitudes toward cultural, social, and economic issues. These include expressions of cultural heritage, as well as attitudes concerning the economic and political advancement of African Americans. According to Sanders Thompson (1990, 1991), all three are essential components of African Americans' racial identification (see Figure 16.8 on page 648).

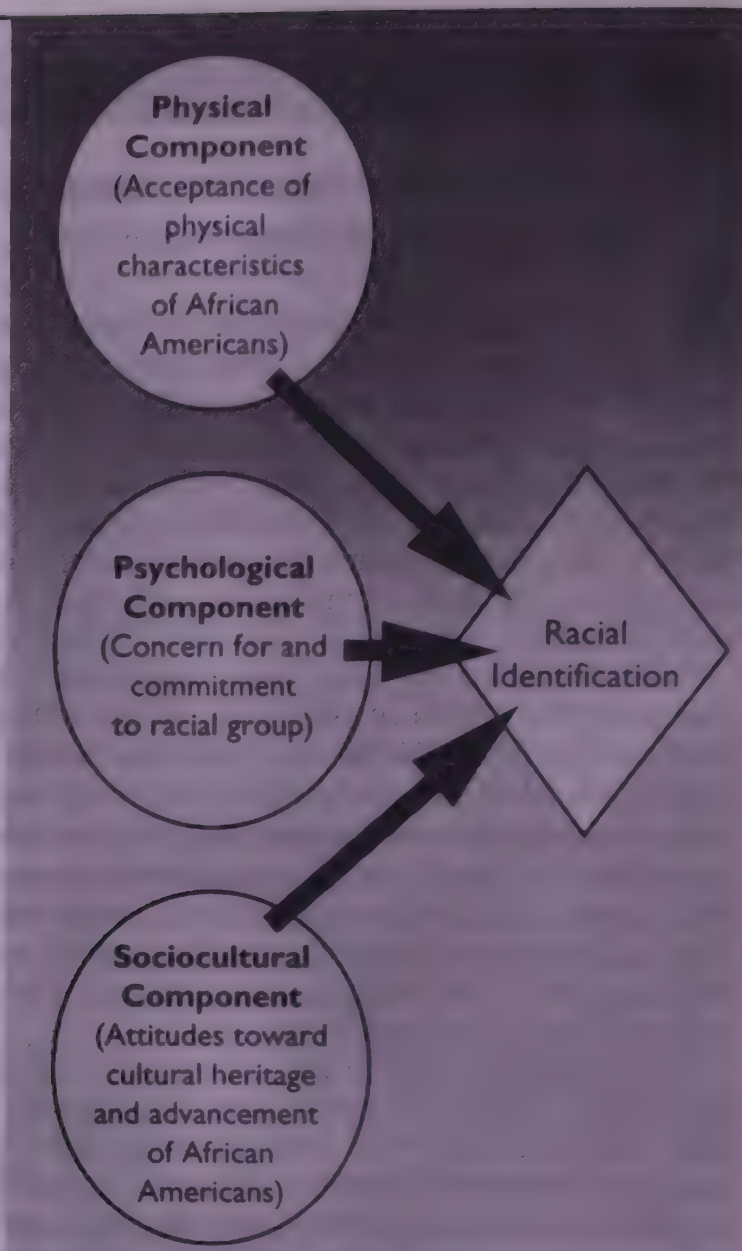
What factors determine the extent to which individuals develop the physical, psychological, and sociocultural reactions described above? In order to find out, Sanders Thompson conducted a study in which almost two hundred African Americans provided information, through interviews and a questionnaire, concerning numerous variables that might influence racial identification. These included demographics (age, income, level of education, and so on) plus many variables relating to social factors, such as when and to what extent respondents had personally experienced racism; whether there had been conflict within their families relating to skin color or social class; and the extent to which respondents interacted with white Americans—the proportion of

Racial Identification: *The extent to which individuals identify with their own racial group.*

FIGURE 16.8

Racial Identification

According to Sanders Thompson (1991), racial identification involves three basic components: physical, psychological, and sociocultural. Her research indicates that the greater the exposure African Americans have had to racial prejudice, the stronger their racial identification.



whites in their neighborhood and school, their experience with interracial dating, and so on.

Results indicated that by far the most important predictor of all three aspects of racial identification was the extent to which respondents had personal experience with racial prejudice. The greater such experience, the stronger their racial identification. Demographic factors such as age, income, and education were less important, although they did play some role in the psychological aspect of racial identification. Not surprisingly, conflicts within one's own family related to skin color or social class significantly predicted physical racial identification.

What do these findings mean? For one thing, that exposure to white prejudice is a key factor in the development of a strong sense of racial identification among African Americans. Such experiences seem to drive home the fact that blacks are viewed as different—as a definite outgroup—by the majority. This, in turn, leads many African Americans to identify strongly with their own group. Such identification can then serve as a source of personal strength and support for the individuals involved (White & Parham, 1990).

So in one crucial respect, majority prejudice may have surprising—and certainly unintended—effects: It can actually serve to strengthen the sense of group cohesion of many African Americans and thus enhance their ability to resist the impact of bigotry. Of course, heightened racial identification among African Americans, or among any other group in a culturally diverse society, is not an unmixed blessing. The ultimate goal in such a society is a high degree of tolerance and cooperation, *not* a series of groups fortified inside their own cultures. Still, if strong racial identification among African Americans boosts

their pride and self-esteem, then the benefits may well outweigh any potential harm. More generally, such effects illustrate once again the resiliency and adaptiveness shown by human beings in the face of adversity.

SOCIAL INFLUENCE: Changing Others' Behavior

How many times each day do others try to influence you in some way? And how often do *you* try to influence them? If you stop and count, you'll probably obtain a surprisingly large number, for efforts at **social influence**—attempts by one or more persons to change the attitudes or behavior of one or more others—are very common. Moreover they take many different forms. In this section we'll examine some of the most common, and most important, of these social influence techniques.

CONFORMITY: TO GET ALONG, OFTEN, WE MUST GO ALONG Have you ever been in a social situation where you felt that you stuck out like a sore thumb? If so, you know how unpleasant the experience can be. In these circumstances we encounter powerful pressures to act or think like those around us. Such pressures toward **conformity**—toward thinking or acting like most other persons—stem from the fact that in many contexts there are spoken or unspoken rules indicating how we *should* or *ought to* behave. These rules are known as **social norms.** Some norms can be both detailed and precise—for example, written constitutions, athletic rule books, traffic signs. In contrast, other norms, such as "Don't stare at strangers on the street" and "Never show up for a party exactly on time" are implicit, yet they still exert powerful effects on us. Whatever form they take, social norms are obeyed by most persons most of the time (Cialdini, 1988).

Is this necessarily bad? Not at all; if most people didn't follow such rules on most occasions, we would live in social chaos. Persons waiting to pay for their purchases in stores would fail to form lines; motorists would drive on whichever side of the road they preferred; people would come to work or show up for meetings whenever they felt like it. So norms and the conformity they produce are a necessary part of social life. Only when they enforce needless uniformity—for example, with respect to styles of dress or personal grooming—do norms and other pressures toward conformity seem objectionable.

Social Influence: *Efforts by one or more individuals to change the attitudes or behavior of one or more others.*

Conformity: *A type of social influence in which individuals experience pressure to adhere to existing social norms.*

Social Norms: *Rules in a given group or society indicating how individuals ought to behave in specific situations.*

"Gotta run, Peter. A new client is on his way up."

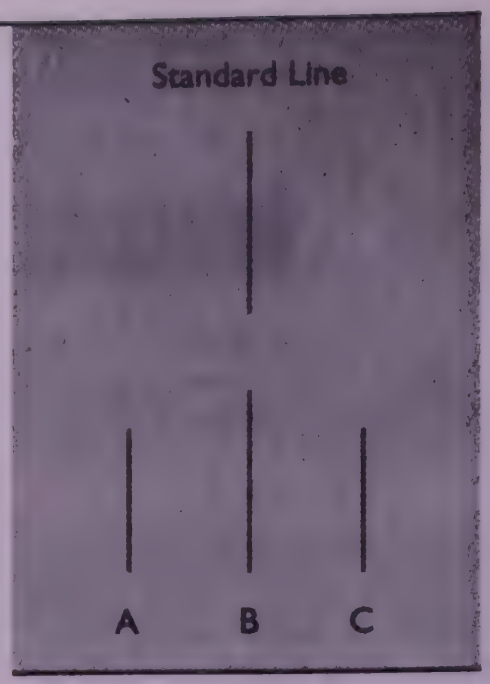
ONE UNUSUAL FORM OF SOCIAL INFLUENCE

Social influence—efforts to change others' behavior—take many different forms.
(*Source:* Drawing by Shanahan; © 1993 The New Yorker Magazine, Inc.)

FIGURE 16.9

Asch's Line-Judging Task: An Example

In one of the problems used by Asch in his famous research on conformity, the participants' task was to indicate which of the three comparison lines (A, B, or C) best matched the standard line in terms of length.



How strong are pressures toward conformity? Research findings suggest the following answer: *powerful indeed.* The fact that we conform to most social norms most of the time is hardly surprising; failure to do so can lead to disapproval or rejection from others. More unexpected, however, is the fact that pressures toward conformity are so strong that we surrender to them even in situations where the costs of failing to conform are minimal—for example, mild embarrassment. This fact was first uncovered by Asch (1951) in research that is now a true classic in social psychology.

To investigate the tendency to succumb to conformity pressures, Asch asked male students to respond to a series of simple perceptual problems in which they were to indicate which of three comparison lines matched a standard line in length (see Figure 16.9). Six to eight other persons were also present, but, unknown to each participant, all were accomplices of the experimenter. These other persons gave their answers before the participant gave his, and on twelve out of the eighteen problems, these answers were clearly wrong. On such occasions, participants faced a dilemma. Should they follow the evidence of their own eyes and disagree with the unanimous group? Or should they go along with these persons even though they believed them to be wrong? The answer was clear: Fully 76 percent of the participants went along with the group's wrong answers at least once. In contrast, only 5 percent of persons in a control group—one that responded to the same problems in the absence of any accomplices—made such errors.

These findings indicate that our tendency to conform is indeed strong; faced with a group of strangers who unanimously voice one opinion, most people tend to agree, even when doing so requires them to contradict the evidence of their own senses!

Does being a psychologist and knowing about such pressures make one immune to them? Far from it. Several years ago, when I was chair of the Department of Psychology at my university, I attended a meeting where the dean described a plan to create a new course for freshmen—a course that would combine psychology, sociology, philosophy, and economics. I took such a course when *I* was a freshman and strongly disliked it, so I was dead-set against the plan. But as I listened with growing horror, the chairs of the other departments all voiced their approval. When it was my turn to comment, I faced the same kind of dilemma as the subjects in Asch's research: Should I express my real views or go along with the group consensus? What I did, I'm sad to report, is waffle. I said something like "Very interesting . . . but I'd like some time to discuss it with my department." Later, I did voice my objections strongly, and in writing. But at that moment, the social pressure was too strong for me to resist.

Factors affecting the degree of conformity. Asch's research demonstrated the existence of powerful pressures toward conformity. Even a moment's reflection indicates, however, that conformity does not occur to the same degree in all settings or among all persons. Several factors have been found to be important in determining when, and to what extent, it occurs.

One of these is *group size*—the number of persons exerting such pressure. Up to a point, the more people around us who agree on or follow a given social

norm, the stronger our own tendency to do so. There are definite limits to this effect, however. After the number of persons exerting conformity pressure rises above three or four, the tendency to go along (to conform) flattens out and increases very little. The reason is that beyond this point we often begin to suspect *collusion*—we conclude that other persons are working together to influence us (Wilder, 1977).

Another factor that influences our tendency to yield to conformity pressure is whether we are alone in our efforts to resist group pressure or have an *ally* in this respect. Participants in Asch's studies faced a *unanimous group* (as I did at that meeting with the dean). But what would have happened if some of the other persons present had given correct answers? Several studies have investigated this question, and results are clear: Under such conditions, conformity is greatly reduced (Allen & Levine, 1971; Morris & Miller, 1975).

A third factor that was once assumed to have a strong effect on conformity is *gender*. I say "once" because, as shown in the **Research Process** section below, recent findings indicate that in fact there are no appreciable differences between women and men in terms of the tendency to conform.

Key Points

- Social influence, or attempts to change others' attitudes or behavior, takes many different forms.
- Social norms often exert strong pressures toward conformity. Group size and the unanimity of the influencing group are factors in conformity, but gender is not.

The Research Process

Gender Differences and Conformity: The Vanishing Myth of Female Submissiveness

Do women and men differ in terms of their tendencies to conform? Even today many people seem to believe that females are more susceptible to conformity pressure than males. After all, persons holding this view might argue, aren't women more likely than men to follow changing fashions? And aren't they more concerned with being liked?

Early studies on this issue seemed to offer support for such beliefs (Crutchfield, 1955). These studies reported that women do indeed show greater conformity than men. More recent experiments, however, point to the conclusion that in fact there are no significant differences between males and females in this respect (e.g., Eagly & Carli, 1981). What accounts for these sharply contrasting findings? Several factors seem to play a role.

Why Early and Later Studies on Conformity Yielded Opposite Results

First, early studies of gender differences in conformity used tasks and materials that were more familiar to males than to females. Since individuals of both genders are more likely to yield to social pressure when they are uncertain about how to behave when they are more confident, it is hardly surprising that females demonstrated higher levels of conformity; after all, the dice were strongly loaded against them (Sistrunk & McDavid, 1971).

Another reason for the disparity in the results may lie in major shifts in gender roles and gender-role stereotypes during the 1970s and 1980s. An ever-increasing number of women have moved into jobs and fields once dominated by males. As a result, stereotypes suggesting that women are less ambitious, less competent, and less independent than males have weakened. And since stereotypes often exert a self-confirming impact on behavior, these changes may be responsible for the fading of any tendency for females to be, or to be perceived as, more susceptible to social influence than males (Maupin & Fisher, 1989).

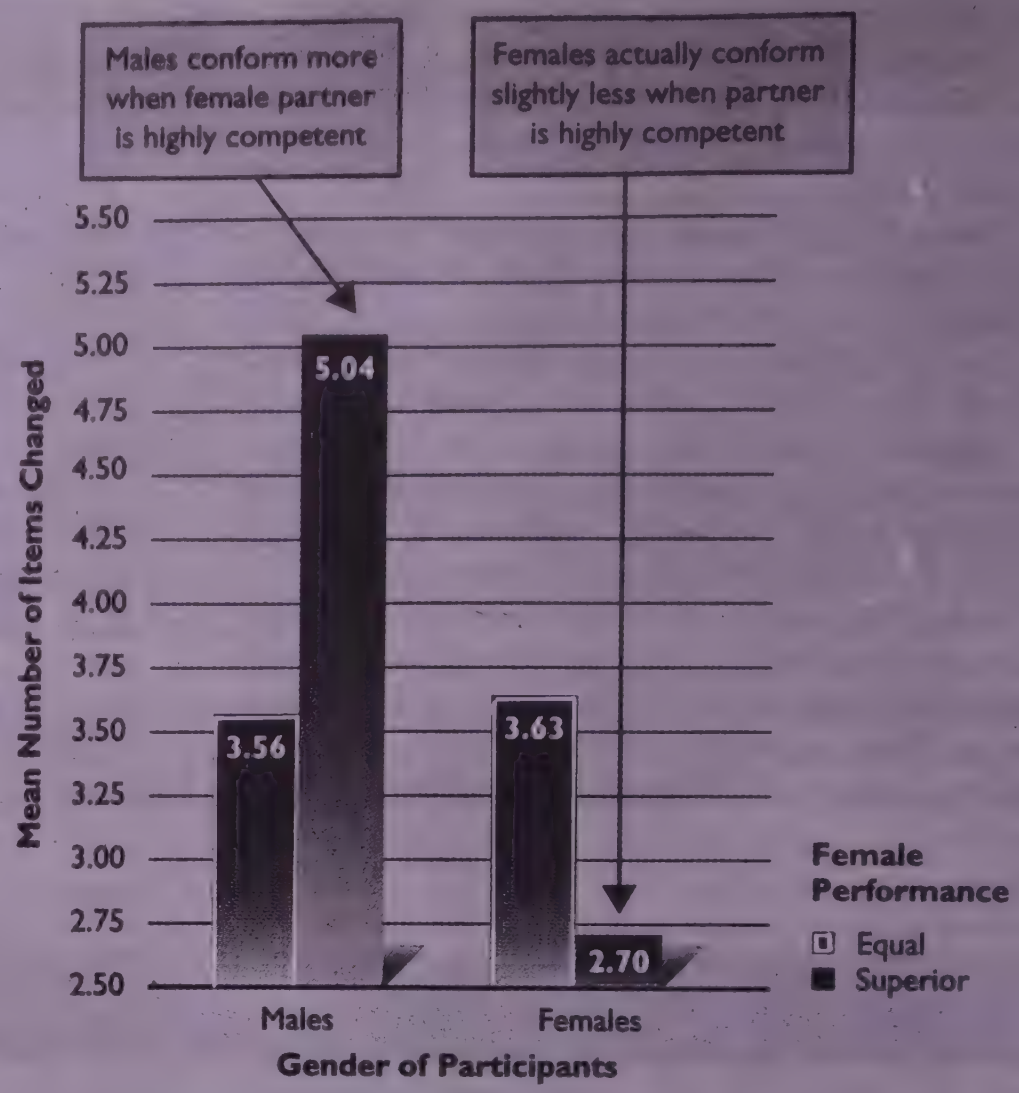
Evidence Indicating That Gender Differences in Conformity Are More Illusory Than Real

Now back to the findings of more modern research. As mentioned earlier, several lines of evidence point to the conclusion that despite widespread assumptions to the contrary, males and females do not actually differ with respect to conformity. One line of research has focused on the following possibility: A key reason why many people continue to believe that females are easier to influence than males may be the fact that females generally have lower economic status

FIGURE 16.10

Evidence against the Existence of Gender Differences in Conformity

Males faced with a female partner who outperformed them on an initial task were more likely to conform to her views than were males faced with a partner whose performance equaled their own. Females who learned that their performance was superior to that of a male partner showed less conformity to his views than those who learned that their score was equal to their partner's.
(*Source:* Based on data from Maupin & Fisher, 1989.)



(Eagly, 1987). Since persons holding low status *are* often easier to influence than those holding higher status, this difference between the sexes may account, at least in part, for the popularity of the view that females are more susceptible to conformity pressure. Support for this reasoning has been obtained in several studies conducted by Eagly and her colleagues (e.g., Steffen & Eagly, 1985). These experiments indicate that people do generally expect greater yielding to social pressure by low-status than by high-status targets, regardless of their gender. When status differences between males and females are eliminated, so, too, are expectations for greater conformity by females.

Another line of research indicates that when females have demonstrated their competence on a task or in a specific situation, they are no more likely to yield to conformity pressure than are males. In fact, under conditions where females have shown *superior* knowledge or expertise, males are more likely to yield to *their* judgments than vice versa. This fact is clearly demonstrated by a study conducted by Maupin and Fisher (1989). These researchers provided pairs of participants (one male, one female) with information suggesting either that the female had performed better than her partner on a task related to intellectual ability or that the two persons had performed equally. Then both participants completed a questionnaire on which they expressed their opinions on a number of different issues. Next, they received information indicating that their partner disagreed with them on several of these items. Finally, they completed the same questionnaire once again.

Yielding to social pressure was measured in terms of the number of items on which participants changed their initial responses in order to agree with those of their partner. As shown in Figure 16.10, males confronted with a female who had outperformed them on the initial task changed more items to agree with her than did males faced with a partner who had performed equally to themselves. Similarly, females who learned that their performance was superior on the initial task showed *less* yielding to their partner than those who learned that their scores had been about equal.

In sum, more recent and more sophisticated research indicates that males and females do *not* differ with respect to the tendency to yield to conformity pressure. If such differences did exist in the past, they have vanished in recent decades and can no longer be observed. This is yet another instance in which, on close and careful examination, gender differences turn out to be more illusory than real.

Critical Thinking Questions

1. If early studies on conformity had used materials equally familiar to females and males, do you think that the pattern of findings obtained would have been any different? If so, why? If not, why?
2. Gender-role stereotypes have not changed equally in all countries. Do you think that gender differences in conformity might exist in cultures where traditional stereotypes are still present?
3. Status differences between males and females have decreased in many societies. If such differences totally vanish, do you think that many people will still perceive females as more susceptible to social pressure than males? If so, why? If not, why?
4. The findings reported by Maupin and Fisher (1989) and other researchers indicate that in accepting influence from others, we pay more attention to expertise than to gender. How does this fit with your own experience? Do you think most males are willing to accept influence from a female with greater expertise than themselves?

Compliance: To Ask—Sometimes—Is to Receive How many times a day do you receive requests? If you kept a record, you'd probably be surprised at the total, for friends, co-workers, family members, and roommates frequently ask us to change various aspects of our behavior. Social psychologists call this form of social influence **compliance,** and in its simplest form, it involves one person accepting a request from another—doing something that the requester wants. The situation is often more complex than this, however. Persons wishing to obtain compliance often take preliminary steps designed to increase the likelihood that the target person will say yes. Let's consider several of these tactics.

Ingratiation: Liking as an entering wedge for gaining compliance. For whom would you be more likely to do a favor—someone you like or someone you dislike? The former, of course. This fact is the basis for one important technique for gaining compliance: **ingratiation.** Briefly, ingratiation involves efforts to increase one's appeal to a target person before asking that person to grant a request (Liden & Mitchell, 1988; Wortman & Linsenmeier, 1977). What tactics are most successful in this respect? Research on ingratiation and on the related process of **impression management**—steps people take to enhance the impression they make on others—suggests that the following procedures are often useful: (1) indicating that we agree with target persons or share their views on various issues; (2) praising or flattering them (without overdoing it, of course!); (3) enhancing our personal appearance through dress, grooming, makeup, and other tactics; (4) associating ourselves with important or respected people (by name dropping, for example); (5) emitting many positive nonverbal cues, such as smiles and other signs that we like and are interested in the target person; and (6) making self-deprecating remarks—mild put-downs of ourselves, indicating that we realize we aren't perfect and that we have an appropriate sense of humility. Would you like a stranger who engaged in such tactics more than one who did not? Research findings suggest that you would (e.g., Baron et al., 1990; Godfrey, Jones, & Lord, 1986; Liden & Mitchell, 1988). So when salespersons and others who have something to gain from influencing you use such tactics, beware: Efforts to gain compliance may soon follow.

Multiple requests: Compliance as a two-step process. Suppose you wanted a fairly large favor from one of your friends. Would you approach this person and make your request cold, or would you try to do something to tip the balance in your favor first? Probably you would choose the latter

Compliance: *A form of social influence in which one or more persons accepts direct requests from one or more others.*

Ingratiation: *A technique of social influence based on inducing increased liking in the target person before influence is attempted.*

Impression Management: *Efforts by individuals to enhance the impression they make on others.*

course of action, especially if the favor were an important one. But what specific steps would help? Three different tactics seem to be effective.

In the first, known as the **foot-in-the-door technique,** you would start with a small request and then, once this was granted, escalate to a larger one. The results of many studies indicate that starting with the small request does increase the chances that the target person will also agree to the second, larger request (Beaman et al., 1983; Freedman & Fraser, 1966). Apparently this is so because once people have agreed to a small request, they feel that saying no to another request would threaten their enhanced self-image—their image of themselves as a helpful, considerate person (Eisenberg et al., 1987).

A second and exactly opposite technique for gaining increased compliance is known as the **door-in-the-face technique.** Here, you would start with a very large request; then, when this was rejected, you'd "back down" to a much smaller one—the one you wanted all along. This technique, too, seems to be effective in gaining increased compliance, primarily because when you retreat to the smaller request, this puts subtle pressure on the target person to make a similar concession; after all, it seems only reasonable to reciprocate in some manner (Cialdini et al., 1975; Pendleton & Batson, 1979).

A third tactic for gaining compliance is known as the **that's-not-all approach.** The basic idea here is to throw something extra into the situation *before* the target person has had a chance to say yes or no. This extra "deal-sweetener" can be very trivial in scope. For example, automobile dealers often offer to include an inexpensive option such as floor mats when they sense that a potential customer is hesitating. In economic terms, they are offering something that costs them about $35 in order to close a sale of $15,000 or more. Yet this technique often works (Burger, 1986). The small "extra" is often enough to increase the likelihood that the target person will say yes. Again, the reason seems to be that the target person feels the need to make a concession in response to the improved offer, and this translates into agreeing to accept the deal being offered.

In sum, there are many ways of gaining compliance from others, and persons skilled in the use of these tactics can often substantially increase the odds of getting what they want.

Complaining: Griping one's way to compliance. Before concluding this discussion of compliance, I should add one additional tactic that many persons use to exert such social influence: **complaining**—expressing discontent or dissatisfaction with yourself or some aspect of the social world. Research on complaining indicates that it is often quite effective in gaining compliance (Alicke et al., 1992). While most complaints seem to serve the function of emotional "venting," a sizable proportion (almost 10 percent) are aimed at changing others' behavior. And such complaints do succeed, at least part of the time. Indeed, when asked to keep a diary of their own complaints, college students reported that complaining helped them gain compliance with their wishes about 25 percent of the time (Alicke et al., 1992) (see Figure 16.11).

Interestingly, females and males appear to complain about somewhat different topics. Females complain about themselves—their appearance or feelings—more often than males do, while males complain more often about other persons (Klotz & Alicke, 1993). And females show more supportive reactions to others' complaints than do males do. They offer more suggestions for dealing with the topic of the complaints and more emotional support ("I know exactly how you feel"). In contrast, males are more likely to ignore others' complaints or to reject them ("Big deal!"). So, while both sexes use complaints in their dealings with others, there appear to be some differences in precisely *how* they use this technique.

Foot-in-the-Door Technique: *A technique for gaining compliance in which a small request is followed by a larger one.*

Door-in-the-Face Technique: *A technique for gaining compliance in which a large request is followed by a smaller one.*

That's-Not-All Approach: *A technique for gaining compliance in which a small extra incentive is offered before the target person has agreed to or rejected a request.*

Complaining: *Expressing discontent or dissatisfaction with oneself or with some aspect of the external world.*

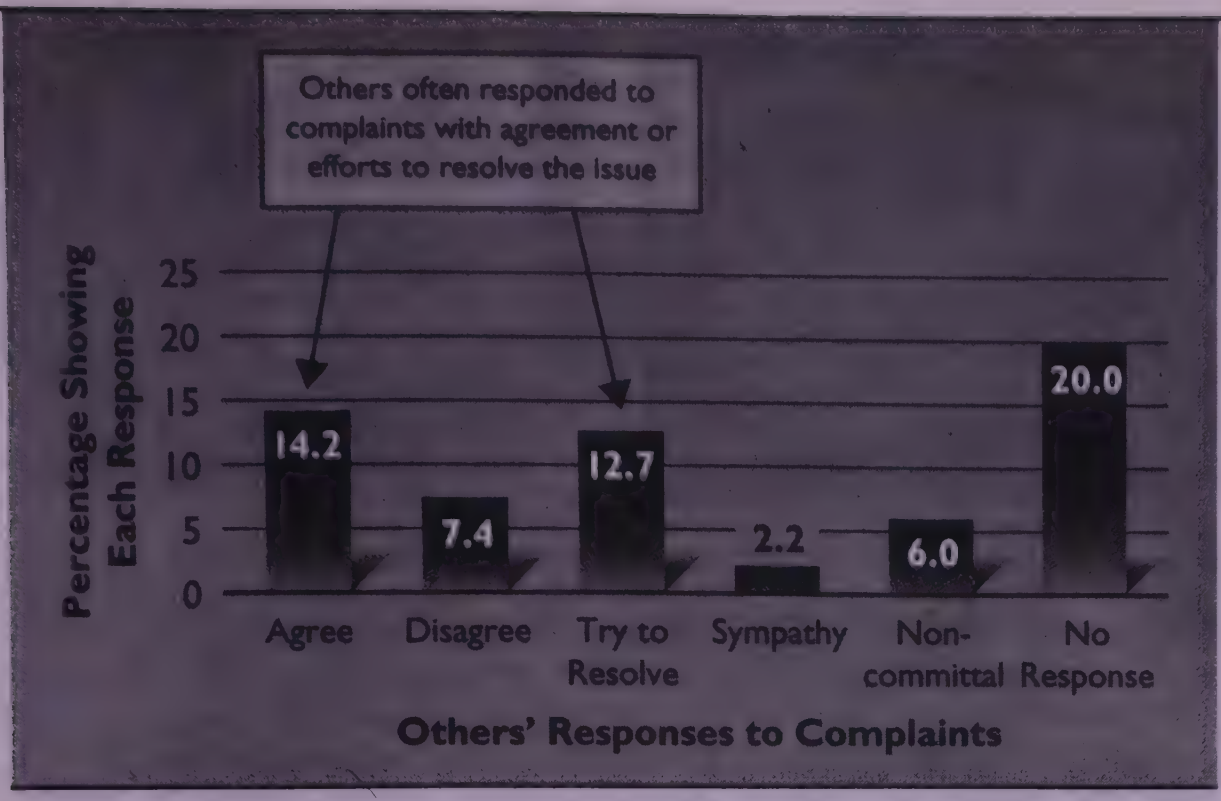


FIGURE 16.11

Complaining as a Technique for Gaining Compliance

Individuals often complain to others as a means of changing others' behavior. As shown here, students who kept a diary of their complaints reported that other persons often complied with the changes requested implicitly or explicitly in the complaints.
(*Source:* Based on data from Alicke et al., 1992.)

OBEDIENCE: SOCIAL INFLUENCE BY DEMAND What is the most direct technique one person can use to change the behavior of another? One answer is *direct orders*—simply telling the other person to do something. This approach is less common than either conformity pressure or tactics for gaining compliance, but it is far from rare. Executives issue orders to their subordinates; military officers shout commands that they expect to be obeyed; parents, police officers, and sports coaches all influence others in the same manner. **Obedience** to the commands of sources of authority is far from surprising: Such sources have powerful means for enforcing their orders. More surprising, though, is the fact that even persons lacking in such authority can sometimes induce high levels of obedience in others. Unsettling evidence for such effects was first reported by Stanley Milgram in a series of famous and controversial experiments (Milgram, 1963, 1974).

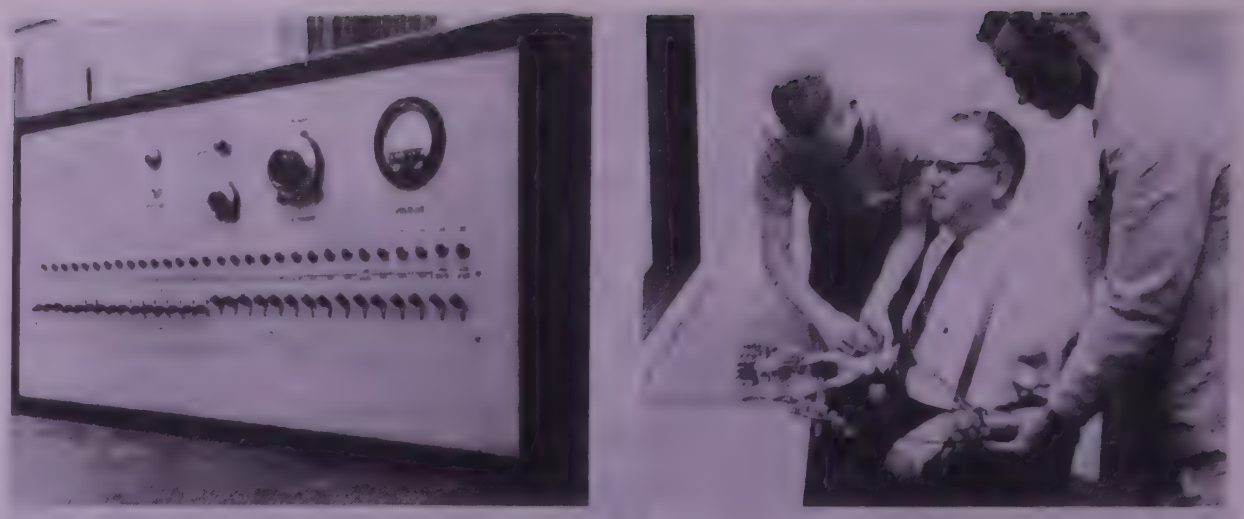
Destructive obedience: Basic findings. In order to find out whether individuals would obey commands from a relatively powerless stranger, Milgram designed an ingenious set of procedures. Participants were told that they were taking part in a study on the effects of punishment on learning. Their role was to deliver electric shocks to a male "learner," actually an assistant of the experimenter, each time he made an error in a simple learning task. These shocks were delivered by means of switches on special equipment shown in the photo on page 656, and participants were told to move to the next higher switch each time the learner made an error. The first switch delivered a shock of 15 volts, the second a shock of 30, and so on up to the last switch, which supposedly delivered a shock of fully 450 volts. In reality, *the accomplice never received any shocks during the study*. The only real shock was a mild demonstration pulse from button number three used to convince participants that the equipment was real.

During the session the learner seemed to make many errors, so participants soon faced a dilemma: Should they continue punishing this person with increasingly painful shocks, or should they refuse to continue? The experimenter pressured them to continue, so the choice wasn't easy. Since participants were volunteers and were paid in advance, you might predict that they would quickly refuse such orders. In reality, though, *fully 65 percent*

Obedience: *A form of social influence in which one individual issues orders to another to behave in a specific way.*

Milgram's Equipment and Procedure

The photo on the left shows the apparatus used by Milgram in his famous studies of obedience. The photo on the right shows the experimenter (Milgram, in a white coat) and a participant (rear) attaching the electrodes to the learner's (accomplice's) wrists. (*Source:* From the film *Obedience*, distributed by the New York University Film Library, Copyright 1965 by Stanley Milgram. Reprinted by permission of the copyright holder.)

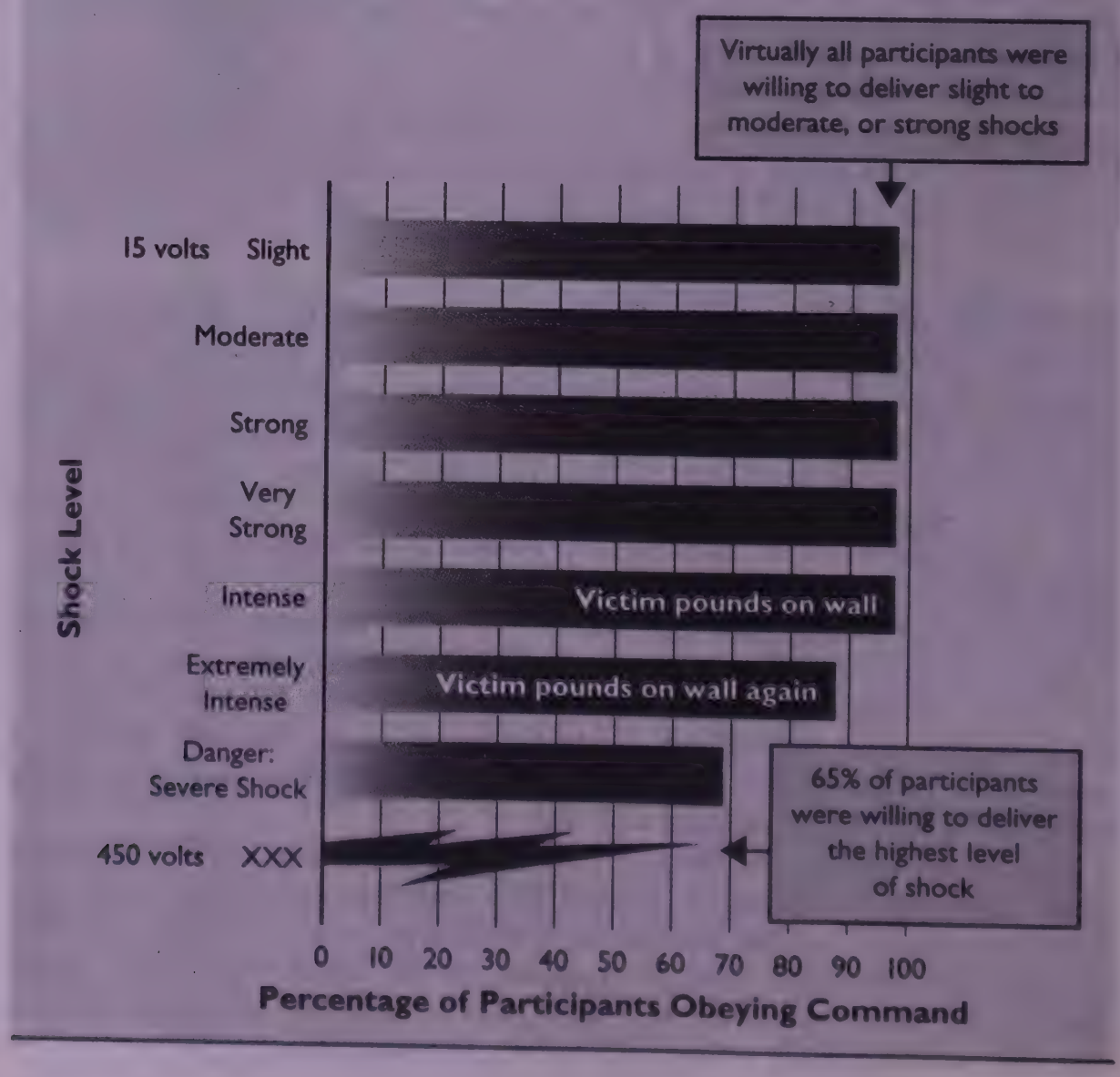


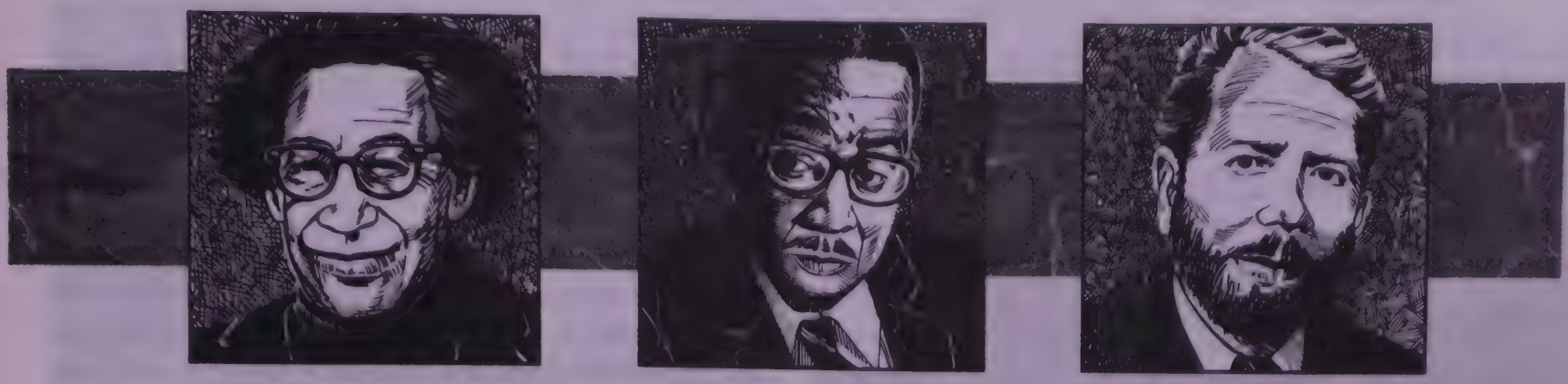
showed total obedience, continuing through the entire series to the final 450-volt shock (see Figure 16.12). Of course, many persons protested and expressed concern over the learner's welfare. When ordered to proceed, however, most yielded to social influence and continued to obey. Indeed, they did so even when the victim pounded on the wall as if in protest against the painful shocks he was receiving. Similar findings have been obtained in studies conducted around the world (Jordan, Germany, Australia) and with children as well as adults, so this tendency to obey seemingly dangerous commands from a relatively powerless source of authority appears to be quite general (e.g., Kilham & Mann, 1974; Shanab & Yahya, 1977).

FIGURE 16.12

Milgram's Research on Obedience

This graph illustrates the proportion of participants who obeyed the experimenter's commands at various levels of shock. Fully 65 percent obeyed at the highest shock level—supposedly 450 volts! (*Source:* Based on data from Milgram.)





Leon Festinger

Festinger is well-known in psychology for his theory of cognitive dissonance. According to this theory, individuals experience an unpleasant state known as cognitive dissonance when they notice that their attitudes and their behavior or various attitudes that they hold are inconsistent. They may then change either their attitudes or their behavior in order to reduce the cognitive dissonance.

Kenneth B. Clark

Clark is a noted researcher of prejudice. His work on the harmful effects of segregation was cited by the U.S. Supreme Court in its 1954 decision *Brown v. Board of Education*. Clark is past president of the American Psychological Association (1970–1971), the first African American to hold the position.

Stanley Milgram

Milgram's research focused on the concept of obedience. In a series of chilling (and ethically questionable) experiments, he showed that ordinary people were surprisingly willing to comply with instructions to inflict pain on another person when ordered to do so by someone with authority.

Key People in Social Psychology

Destructive obedience: Why does it occur, and how can it be resisted? The results obtained by Milgram are very disturbing. The parallels between the behavior of participants in his studies and atrocities against civilians during times of war or civil unrest are clear. But why, precisely, do such effects occur? Why were participants in these experiments so willing to yield to the commands of a relatively powerless person? Several factors seem to play a role.

First, in each case the experimenter relieved participants of all personal responsibility. He indicated that he, not they, would be responsible for the victim's welfare. So, just as in many real-life situations where soldiers or police commit atrocities, participants could say, "I was only following orders." An analysis of situations in which people obey commands that cause them to violate widely accepted moral or ethical standards (Kelman & Hamilton, 1989) suggests that the absence or diffusion of personal responsibility plays a major role. Indeed, this may be a central factor in the occurrence of what Kelman and Hamilton (1989) term *crimes of obedience* (Hans, 1992).

Second, the experimenter possessed clear signs of authority, and existing social norms suggest that persons holding authority are to be obeyed (Bushman, 1984, 1988).

KEY POINTS

- Compliance is often gained through techniques such as ingratiation or through multiple requests, as in the foot-in-the-door or door-in-the-face techniques. Also useful in increasing compliance are the that's-not-all approach and complaining.
- Obedience is a form of social influence in which one person follows direct orders from another.
- Research findings indicate that many people will obey commands to harm another person.
- Destructive obedience is reduced by exposure to disobedient models, acceptance of personal responsibility, and evidence that authority figures are seeking selfish ends.

Third, the experimenter's commands were gradual in nature. He didn't request that participants jump to the 450-volt shock immediately; rather, he moved toward this request one step at a time. Again, this is similar to many real-life situations in which police or military personnel are initially ordered merely to question, arrest, or threaten potential victims. Only later are they ordered to beat, torture, or even kill unarmed persons.

In sum, several factors probably contributed to the high levels of obedience observed in Milgram's research and related studies. Together, these factors merge into a powerful force—one that most persons find difficult to resist. But this does not mean that commands from authority figures *cannot* be resisted. In fact, events in 1989 and afterwards in Germany, the former Soviet Union, Poland, and many other countries suggest that *dis*obedience is sometimes a real option. In these countries, repressive Communist regimes that had ruled for decades disappeared overnight when large numbers of citizens refused to obey their commands. What factors contributed to these dramatic events? Systematic research indicates that important factors in disobedience include exposure to *disobedient models*—persons who refuse to obey; increased personal responsibility for the outcome produced (Hamilton, 1978); and clear evidence that authorities are pursuing selfish rather than prosocial goals (Saks, 1992). When such conditions prevail, the power of authorities to command may be sharply curtailed, despite their possession of guns, planes, and tanks; and victory may ultimately go to those on the side of freedom and decency.

Please see the **Key Concept** page for an overview of major techniques of social influence.

PROSOCIAL BEHAVIOR: NOT A CERTAINTY

Prosocial behavior is common, but far from guaranteed. In many instances, people ignore direct requests for help from others.

PROSOCIAL BEHAVIOR: When We Help . . . and When We Don't

In chapter 10 we examined *aggression*, a form of social behavior in which individuals attempt to harm others (Baron & Richardson, 1994). Here, to balance the picture, we'll focus on behavior that is in some respects precisely opposite: **prosocial behavior**. Such behavior involves actions that benefit others without necessarily providing any direct benefit to the person performing them (Spacapan & Oskamp, 1992).

Prosocial Behavior: *Actions that benefit others without necessarily providing any direct benefit to the persons who perform them.*

Fortunately, prosocial behavior is a common part of social life. Each day most of us perform favors for others and help them in various ways. Further, we often do so without demanding direct or immediate repayment for such aid. Yet while prosocial behavior is common, there are many instances in which it fails to occur. People sometimes *don't* help others who need assistance very badly, and even ignore direct pleas for aid. If you've ever ignored charity workers seeking donations or walked by a homeless person begging for small change, you are quite familiar with this fact (Steinfels, 1992).

So prosocial behavior is neither automatic nor assured. This fact has led social psychologists to focus much attention on the following question: What factors determine whether and to what extent people offer help to others? As we'll now see, several factors play an important role.

KEY CONCEPT

Major Forms of Social Influence

Conformity

Individuals experience pressure to "stay in line"—to adhere to widely accepted social norms. Although many persons object to such pressures, evidence indicates that most of us do conform in many situations.

Many social groups exert strong pressure on their members to conform in terms of style of dress.

Salespersons use many different techniques to gain compliance from potential customers.

Compliance

Ingratiation

An individual tries to get a target person to like her/him and then uses this liking as a basis for exerting influence (e.g., making requests).

Foot-in-the-Door Technique

Requester makes initial, small request with which target person is almost certain to comply. This is followed by a larger request—the one the requester really wants.

Door-in-the-Face Technique

Requester makes large initial request, one the target person is certain to reject. This is followed by a smaller request—the one the requester really wants.

That's-Not-All Approach

Initial request or offer is made and then, before the target person can respond, a small "extra" is added.

Obedience

One person issues direct orders to another. Tendencies toward obedience are strong; indeed, many persons obey commands from sources of authority having no means of enforcing those orders.

Authority figures, such as judges, can simply order other persons to obey.

The Bystander Effect: Why There's Not Always Safety in Numbers

Research in social psychology, like that in other fields, usually stems from carefully developed theories. Occasionally, however, it is stimulated by a dramatic incident that captures the attention of social psychologists. One such incident occurred in New York City one night in the mid-1960s. A young woman named Catherine (Kitty) Genovese was returning home from her job when she was attacked by a man with a knife. She ran, but he chased her and stabbed her when he caught her. Genovese screamed for help, and lights came on in many windows in nearby buildings. Seeing these, the attacker fled. When no one actually came to her aid, however, he returned and stabbed her again. Once more Genovese screamed for help, but not a single person came to her aid. The attack continued until she lay dead.

Why did no one help or even phone the police? What invisible barriers prevented all those law-abiding citizens who witnessed the crime from offering assistance? Two social psychologists offered an answer. Darley and Latané (1968) reasoned that perhaps no one had come to Kitty Genovese's aid because all the witnesses assumed that someone else would rush to her rescue; after all, there were many other potential helpers. In short, Darley and Latané suggested that where helping in emergencies is concerned, there may be *danger*, not safety, in numbers. Was this hypothesis correct? To find out, they conducted a famous experiment (Darley & Latané, 1968) in which male participants seated alone in separate rooms overheard another person experience what seemed to be an intense epileptic seizure. The incident was staged by means of a special tape recording, but to participants it seemed frighteningly real.

To examine the potential effects of the presence of other bystanders on bystanders' willingness to help, participants in three conditions were led to believe that (1) only they and the victim were present; (2) they, the victim, and one other bystander were present; or (3) they, the victim, and four other persons were present. Results offered strong support for what has come to be known as the **bystander effect**—a reduced tendency of witnesses to an emergency to help when they believe that there are other potential helpers present. As the number of supposed bystanders increased, the percentage of participants who rushed from their room to offer assistance dropped sharply, from 85 percent to 31 percent, and the time that passed before help was offered increased, from 52 to 166 seconds.

These results were soon confirmed in many other studies, so it appeared that **diffusion of responsibility**—a sharing of responsibility among all potential helpers—plays an important role in determining whether and how quickly victims receive aid in emergencies. Moreover, recent findings indicate that the higher the population density of various cities, the lower the incidence of spontaneous helping behavior in them (Levine et al., 1994). This same research indicates that it is not the size of a city that is crucial; rather, it is *population density*—the number of people per square mile, and thus the number of potential helpers in the immediate vicinity. But diffusion of responsibility, important as it is, is far from the entire story; several other factors also play significant roles in people's tendency to help others. One of the most important of these is potential helpers' present mood.

Bystander Effect: *A reduced tendency of witnesses to an emergency to help when they believe that there are other potential helpers present.*

Diffusion of Responsibility: *A sharing of responsibility among all potential helpers who witness an emergency; the result is that each feels less responsible for helping victims.*

Feeling Good or Feeling Bad and Helping: Mood and Prosocial Behavior

Are you more likely to offer help to others when in a good mood or in a bad mood? The answer seems obvious: when you are in a good mood. And in fact, many studies offer support for this view (Isen, 1987). People exposed to virtually any event or condition that elevates their mood—finding a coin in a phone booth, watching a funny comedy film, or even smelling pleasant aromas—are more willing to help others than persons not exposed to such mood-elevating events (Baron & Thomley, 1994; Wilson, 1981). This is

not always the case, however. When the consequences of helping look unpleasant—for example, when the victim is bleeding or might be sick—people in a good mood actually appear to be *less* likely to help than others. Apparently this is because they are reluctant to undertake actions that will interfere with their good mood (Shaffer & Graziano, 1983).

What about being in a bad mood; can this, too, influence helping? Common sense suggests that negative moods might inhibit prosocial behavior, and research findings confirm this suggestion—but again, only under some conditions. Specifically, being in a bad mood tends to reduce helping when potential helpers focus on their own needs or misfortunes (e.g., Thompson, Cowan, & Rosenhan, 1980). Under other conditions, in contrast, being in a bad mood can have the opposite effect—it can increase the tendency to help. How can this be so? The answer has to do with the fact that helping others sometimes makes us feel good. They thank us, and we can observe the good effects of our aid and can also pat ourselves on the back for engaging in prosocial behavior. Such reactions can serve to counter negative moods—an effect social psychologists describe as *negative state relief.* Helping, then, can sometimes be motivated by this factor: by the desire to counter our own negative moods (Cialdini, Kenrick, & Bauman, 1982; Cunningham et al., 1990).

In sum, the tendency to engage in prosocial behavior is often strongly affected by our current moods. However, the direction of such effects depends on several factors, such as the consequences of helping and the extent to which we focus on our own moods or the plight of the victims.

Personal Characteristics and Helping My grandfather was on the mailing list of every major charity; he donated to all of them regularly. Interestingly, he did this over the protests of my grandmother, who often proclaimed that she didn't believe in giving money to strangers. This sharp contrast in my grandparents' attitudes, and in their charitable donations, emphasizes the fact that there are large individual differences in the tendency to help. In other words, some persons are much more likely to engage in prosocial behavior than others. What characteristics are related to these differences? An intriguing study conducted by Bierhoff, Klein, and Kramp (1991) provides some answers.

These researchers obtained the names of persons who had administered first aid to accident victims before the ambulance arrived. Then they contacted these persons and asked them to complete a questionnaire that measured many personal characteristics the researchers believed might be linked to such helping. A second group, who had witnessed accidents but failed to help, also completed the questionnaire. When the responses of the two groups were compared, interesting differences emerged. For example, those who offered first aid had stronger beliefs in a *just world;* they tended to believe that the world is a fair and predictable place in which good behavior is rewarded and bad behavior is punished. In addition, they were higher in *internal locus of control*—the belief that people can control their own outcomes or fate. Third, the persons who engaged in helping were higher in *social responsibility*—the idea that we are responsible for others and should help them when the need arises. Finally, those who had helped were *lower* than the control group in *egocentrism,* or concern with themselves and their own problems. In sum, it appears that because of a combination of beliefs and characteristics, some persons are much more likely than others to engage in prosocial behavior. Clearly, these are the kind of individuals we all hope will be around if *we* are unfortunate enough to become the victim of an accident, crime, or natural disaster.

Who Helps in Emergencies? Personal Characteristics Do Matter

Persons who rush forward to help the victims of accidents appear to differ from those who fail to help in several important respects.

Key Points

- Prosocial behavior involves actions that benefit others without necessarily providing any direct benefit to the persons who perform them.
- The more witnesses present at the scene of an emergency, the less likely the victim is to receive aid; this is known as the bystander effect.
- Other influences on helping include current moods, beliefs, and characteristics of potential helpers.

Attraction, Love, and Close Relationships

According to the lyrics of one old song, "Love makes the world go round." And most people agree: **Love**—an intense emotional state involving attraction, sexual desire, and deep concern for another person—exerts a profound influence on our lives (Hatfield & Rapson, 1993; Hendrick & Hendrick, 1992). Here, we'll consider what psychologists have discovered not only about love, but also about *interpersonal attraction*—the extent to which we like or dislike others—and about *close relationships*—long-term relationships with other persons (Baron & Byrne, 1994).

Interpersonal Attraction: Liking and Disliking Others Think of someone you like very much, someone you strongly dislike, and someone you'd place in the middle of this dimension. Now, ask yourself this question: *Why* do you have these reactions? Research on the nature and causes of **interpersonal attraction** provides some interesting answers.

Propinquity: Nearness makes the heart grow fonder. Many friendships and romances start when individuals are brought into contact with one another, often by chance. Thus, in a key sense, **propinquity**—physical proximity and the interpersonal contact it produces—is a necessary condition for interpersonal attraction. Many studies confirm this basic fact (Festinger, Schachter, & Back, 1950). In general, the closer to one another people live, work, or even sit in a college classroom, the more likely they are to form friendships and grow to like each other.

Why does propinquity often lead to attraction? In part because the more frequently we are exposed to almost any stimulus, the more positive our reactions toward it tend to be. This is known as the **repeated exposure effect,** and it seems to operate as strongly in relation to people as with many aspects of the physical world (Bornstein, 1989; Zajonc, 1968). The more often we are exposed to others, the more familiar they become, the more comfortable we feel in their presence, and the more we tend to like them (e.g., Moreland & Beach, 1992). For this reason, propinquity is one important basis for interpersonal attraction.

Similarity: Liking others who are like ourselves. You've probably heard both of the following proverbs: "Birds of a feather flock together" and "Opposites attract." Which is true? A large amount of evidence leaves little room for doubt: Similarity wins hands down (Byrne, 1971; Park & Fink, 1989). Moreover, this is so whether such similarity relates to attitudes and beliefs, to personality traits, to success in school, to personal habits such as drinking and smoking, or even to whether others are morning or evening persons (see chapter 4) (Jamieson, Lydon, & Zanna, 1987).

Why do we like others who are similar to ourselves? The most plausible explanation is that such persons provide validation for our views or our personal characteristics (Goethals, 1986). If they agree with us, this indicates that our views are correct; and if they share our traits, this indicates that these are desirable ones—or at least ones shared by other persons. Whatever the precise mechanisms involved, though, it is clear that similarity is another important determinant of interpersonal attraction.

Reciprocity: Liking others who like us. When we examined the topic of *ingratiation*, we saw that one way of getting others to like us is to express positive feelings toward them. This suggests that one important determinant of attraction may be others' feelings toward us. In fact, many studies indicate

Love: *A strong emotional state involving attraction, sexual desire, and concern for another person.*

Interpersonal Attraction: *The extent to which we like or dislike other persons.*

Propinquity: *Physical proximity and the interpersonal contact it produces.*

Repeated Exposure Effect: *The fact that the more frequently we are exposed to various stimuli (at least up to a point), the more we tend to like them.*

that this is the case: The more others like us, the more, in general, we tend to like them (Condon & Crano, 1988; Curtis & Miller, 1986). Why is this the case? Largely because we enjoy receiving positive evaluations and strongly dislike negative ones. Thus, we tend to like others who express positive sentiments about us. Indeed, this tendency is so strong that it prevails even in situations where we believe that others' assessments of us are inaccurate (Swann et al., 1987) or represent an obvious attempt at flattery (Drachman, DeCarufel, & Insko, 1978)!

Physical attractiveness: Beauty may be only skin deep, but we pay lots of attention to skin. Perhaps the most obvious factor affecting interpersonal attraction is *physical beauty*. Are we really suckers for a pretty or handsome face? A large body of research findings indicates that we are (Hatfield & Rapson, 1993). Moreover, this is true for both women and men, although the effects seem to be somewhat stronger for males (Feingold, 1990; Pierce, 1992). Interestingly, the effects of physical attractiveness are visible across the entire life span. For example, twelve-month-old infants demonstrate more positive reactions to a stranger wearing an attractive mask than to a stranger wearing an unattractive mask (Langlois & Roggman, 1990); and persons in their seventies and eighties still report a preference for others who are high in physical attractiveness (Pittenger, Mark, & Johnson, 1989).

But what, precisely, *is* physical attractiveness? What makes someone physically attractive to others? Clearly, this varies greatly from culture to culture; but within Western societies several characteristics have been found to be closely related to ratings of attractiveness. With respect to facial features, it appears that most men find two facial types attractive in women: youthful, childlike features (large, widely spaced eyes; small nose and chin) or bolder, more "mature" features (prominent cheekbones, narrow cheeks, high eyebrows, large pupils, a big smile) (Cunningham, 1986). Additional findings suggest that faces are perceived as attractive when they don't depart in any pronounced way from the "typical" face in their culture. To test this assertion, Langlois and Roggman (1990) constructed composite faces from photos of different individuals. They found that the more faces they used in constructing these composites, the more attractive the composites were rated as being (Langlois & Roggman, 1990). So, like Goldilocks in the nursery story, we seem to prefer faces that are "just right"—ones that do not depart from average by too much in any direction.

PHYSICAL ATTRACTIVENESS IN DIFFERENT CULTURES

Different cultures may have sharply contrasting views about what makes a person physically attractive.

Turning to body features, it appears that many men find medium-size breasts and a slim figure attractive in women (Franzoi & Herzog, 1987), while women find men with broad shoulders, small backsides, and a narrow waist attractive (Lavrakas, 1975). Height, too, is important, especially for women: They don't necessarily prefer tall men, but do prefer ones who are taller than themselves (Pierce, 1992). This preference is weaker among men, but they tend to prefer women somewhat shorter than themselves.

Keep in mind that these findings are averages across thousands of people; huge differences exist with respect to individual preferences. And the findings are based mainly on research conducted in Western cultures; as we noted earlier, standards of physical beauty vary greatly around the world, so these may not generalize to all societies.

LOVE: THE MOST INTENSE FORM OF ATTRACTION And now at last we come to what many would consider the heart of the matter: love. Countless poets, novelists, and philosophers, as well as billions of ordinary human beings, have pondered the nature of love since the dawn of civilization. Yet, surprisingly, it is only within the past few decades that love has become the topic of systematic research by psychologists (e.g., Hatfield & Rapson, 1993; Hendrick & Hendrick, 1992). While this research has certainly not answered all our questions about love, it *has* added significantly to our understanding of this important topic. Since most research has focused on romantic or passionate love, I'll also emphasize those aspects of love here. But please remember that passionate love is not the only kind of love or necessarily the most important kind. Any theory that attempts to explain love must also consider other types, too, such as the love of parents for their children and the kind of love that remains in stable marriages long after the first flames of passion have subsided (Borello & Thompson, 1990; Hatfield, 1988).

Romantic love: Its basic nature. One approach to understanding the nature of **romantic love** is to begin by asking the following question: What conditions are necessary before individuals are willing to conclude that they are in love? Research on this issue indicates that three basic conditions may be necessary (Hatfield, 1988; Hatfield & Walster, 1981).

First, the persons involved must experience strong emotional arousal; love, after all, is an intense emotional state. Second, they must experience such feelings in the presence of an appropriate person—someone defined by their culture as a suitable object for such feelings. Third, the concept of romantic love must be present in the individuals' culture. Not all cultures have this concept; and when it is lacking, it is difficult for persons to state that they have "fallen in love," since they don't have a clear idea of what this involves. In cultures where the idea of romantic love is absent, people do not marry for love and do not regard it as important for a happy relationship (Kaufman, 1980). They expect positive feelings to develop over time rather than being there at the start.

Romantic Love: *A form of love in which feelings of strong attraction and sexual desire toward another person are dominant.*

Companionate Love: *A form of love involving a high degree of commitment and deep concern for the well-being of the beloved.*

But once people report that they are in love, what do they experience? Love obviously means different things to different people; and such differences are reflected in modern theories of love, which describe several rather than only one type of love (e.g., Jacobs, 1992; Sternberg, 1988). Several theories, for example, distinguish among various forms of *passionate* love—love dominated by strong physical attraction—and *companionate* love—love, in the words of one noted researcher, that reflects "the affection we feel for those with whom our lives are deeply entwined" (Hatfield, 1988, p. 205). **Companionate love** emphasizes commitment and concern for the loved

Type of Love	Test Item That Measures This Type of Love
Eros (passionate love)	My lover and I were attracted to each other after we first met.
Friendship love	Love is really a deep friendship, not a mysterious, mystical deep emotion.
Ludos (game-playing love)	I have sometimes had to keep two of my lovers from finding out about each other.
Mania (possessive love)	I cannot relax if I suspect that my lover is with someone else.
Pragma (logical love)	It is best to love someone with a similar background.
Agape (selfless love)	I would rather suffer myself than let my lover suffer.

TABLE 16.1

Types of Love: One Model

A model of love proposed by Hendrick and Hendrick (1986) suggests that there are distinct types of love. Test items designed to measure each of these types are shown in the right-hand column.
(*Source:* Based on suggestions by Hendrick & Hendrick, 1986, and Lasswell & Lobsenz, 1980.)

one's well-being. Other models describe several additional aspects of love; one of these models is summarized in Table 16.1. As you can see, it calls attention to six distinct types of love.

Love: A biochemical interpretation. At this point I should briefly mention one additional approach to understanding love—an approach based largely on biochemical reactions. Some evidence indicates that the shift from passionate love to companionate love may have roots in basic biological systems. According to this view (Gray, 1993), romantic love, which involves intense attraction to another person, triggers the release of amphetamine-like substances within the body, especially *phenylethylamine* (PEA). These substances, in turn, play an important role in the emotional high of love—the rush of excitement and pleasant feelings we experience when we first fall in love. Over time, however, the production of such substances in response to the presence of one's lover decreases. In some cases this leads to the decline of romantic relationships: When the excitement is gone, one or both partners seek a new love, perhaps because they value most of all the emotional high of falling in love. In many other cases, however, the presence of one's lover becomes a stimulus for the production of *endorphins*, substances that are soothing and generate feelings of calmness or contentment. These feelings, in turn, serve as one basis for companionate love. The intense misery many happily married people suffer when their spouse dies is a result of the sharp reduction in endorphins they experience in the absence of this person.

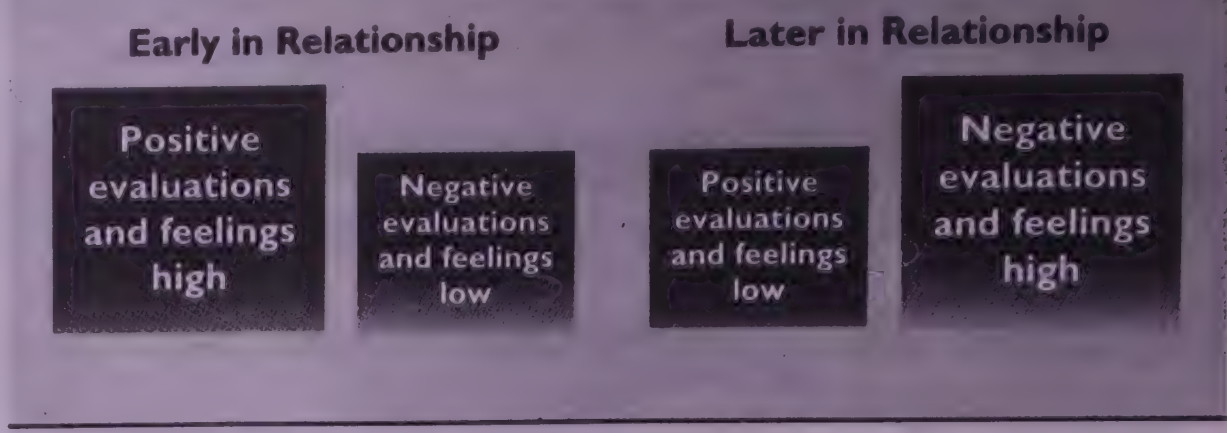
Is this biochemical theory of love accurate? At present, there is not sufficient scientific evidence to tell. But there can be no doubt that love, like all other aspects of human experience, is closely linked to biological processes and that full understanding of this powerful reaction will certainly involve these processes.

Troubled relationships: When love dies. ". . . And they lived happily ever after." This is the way many fairy tales end—with the characters riding off into a glowing, love-filled future. Alas—if only life could match these high hopes. Some romantic relationships do blossom into lifelong commitment; my own parents, for example, recently celebrated their fifty-first anniversary, and my wife and I have just celebrated our twentieth. But all too often, the glow of love fades and leaves behind empty relationships from which one or both partners soon withdraw. What causes such outcomes? Research on intimate relationships suggests that several factors are often at work.

FIGURE 16.13

Self-Defeating Behavior: One Reason Why Relationships Dissolve

Initially, dating couples and newlyweds express mostly positive evaluations and feelings to one another. Over time this pattern may change so that a couple expresses mostly negative evaluations and feelings. If this change goes too far, the relationship may dissolve.



We have already considered one of these factors in chapter 10: *jealousy*. Obviously, if one or both partners in a romantic relationship experience high levels of jealousy, the relationship is in jeopardy. Another factor is romantic partners' increasing discovery of *dissimilarities* between them. Such differences are often hidden by the flames of passion, only to emerge as the persons involved get on with the task of living together (Byrne & Murnen, 1988). In addition, some differences don't develop until after the relationship has lasted for several years. One or both partners may change their religious views, political beliefs, drinking behavior, or sexual preference, while the other does not. In such cases, initial similarity gradually shifts into dissimilarity (Levinger, 1988), with negative implications for the relationship.

Another key problem faced by many couples is simple *boredom*. Over time, the unchanging routines of living may lead people to feel that they are in a rut. The feelings of boredom that result, often a major cause of marital dissatisfaction, contribute to the dissolution of many relationships (Fincham & Bradbury, 1992). I should emphasize that boredom is *not* inevitable in stable relationships. Happily married couples report that they avoid boredom by seeking new stimulation together—new projects they can share, new learning experiences, joint vacations, to mention just a few.

Finally, as relationships persist, patterns of behavior that can only be described as *self-defeating* in nature sometimes develop. Dating couples and newlyweds frequently express positive evaluations and feelings to one another. As time passes, however, these sometimes decrease and are replaced by negative statements and interactions. "It's all your fault!"—either stated or implicit—becomes a frequent form of exchange, and couples spend less time praising and more time criticizing each other (Miller, 1991); see Figure 16.13. When a relationship slips into this pattern, it is in serious trouble. Existing evidence suggests that this pattern of negative interactions is literally deadly: When it develops, love doesn't simply die but is murdered by caustic, biting remarks.

Fortunately, additional research suggests that persons committed to maintaining a happy long-term relationship can avoid all of these pitfalls (Hatfield & Rapson, 1993). The effort required is far from trivial, but the rewards of maintaining love, and remaining in loving relationships, make this one of the most important tasks we can ever undertake.

KEY POINTS

- Interpersonal attraction is influenced by many different factors, including propinquity, similarity, reciprocity, and physical attractiveness.
- Several conditions must be met before people conclude that they are in love: strong emotional arousal, the presence of an appropriate love object, and presence of the cultural concept of love.
- Several kinds of love exist. Among these, passionate love and companionate love appear to be most important. Love may have important biochemical roots.
- Among factors that contribute to the dissolution of relationships and the ending of love are boredom, jealousy, increasing dissimilarity, and shifts to negative patterns of communication.

Environmental Psychology: How the Physical Environment Affects Social Behavior—and Vice Versa

When I was a graduate student, the newspaper at my university ran an editorial complaining bitterly about the fact that the new psychology laboratories were air-conditioned while many dorms were not. I was so incensed by the harsh tone of this article that I wrote a reply, pointing out that it would be impossible to study behavior scientifically if environmental conditions that can strongly affect it, such as temperature, were allowed to vary greatly and at random, depending on the current weather. I didn't realize it at the time, but this was the start of my career-long interest in how the physical environment influences behavior. Some of my earliest research was concerned with the "long-hot-summer" effect—the possibility that high temperatures make people irritable and aggressive (Baron, 1972; Baron & Bell, 1975). And my recent research on air quality, lighting, and fragrance (Baron, 1994) centers on the same question: How does the physical environment influence our behavior, and especially, our social behavior? This issue has been of major interest to both social psychology and the closely related field of **environmental psychology,** which seeks to investigate how the physical environment influences behavior and how human behavior, in turn, affects the environment (Stern, 1992). Let's briefly consider both of these issues.

Effects of the Physical Environment on Social Behavior While many different aspects of the physical environment might potentially influence behavior, most research attention has been focused on three: *temperature, noise,* and *air quality* (Bell, Fisher, Baum, and Greene, 1990). Each of these factors can, under certain conditions, serve as a source of *environmental stress* and exert adverse effects on social behavior. As an example of the research pointing to these conclusions, I'll focus here on the effects of temperature.

Heat and aggression: Do tempers really rise when temperature goes up? During the late 1960s and 1970s, major riots erupted in large cities in the United States and elsewhere. These riots were primarily related to social factors such as prejudice and efforts to overcome it, but psychologists soon noticed that most occurred during warm summer months. Did this mean that commonsense notions connecting heat and aggression are correct—that people really do become "hot under the collar" when exposed to high temperatures? Initial laboratory studies designed to test this notion yielded mixed results: Up to a point—about the mid-80s Fahrenheit—rising temperature did increase aggression. When temperatures rose above this point, however, aggression actually declined, perhaps because the persons involved became more concerned with minimizing their own discomfort than with behaving aggressively against others who had previously annoyed them (Baron, 1978). And in laboratory studies, they could only accomplish this goal by reducing their aggression and so, perhaps, speeding the end of the session (Bell, 1992).

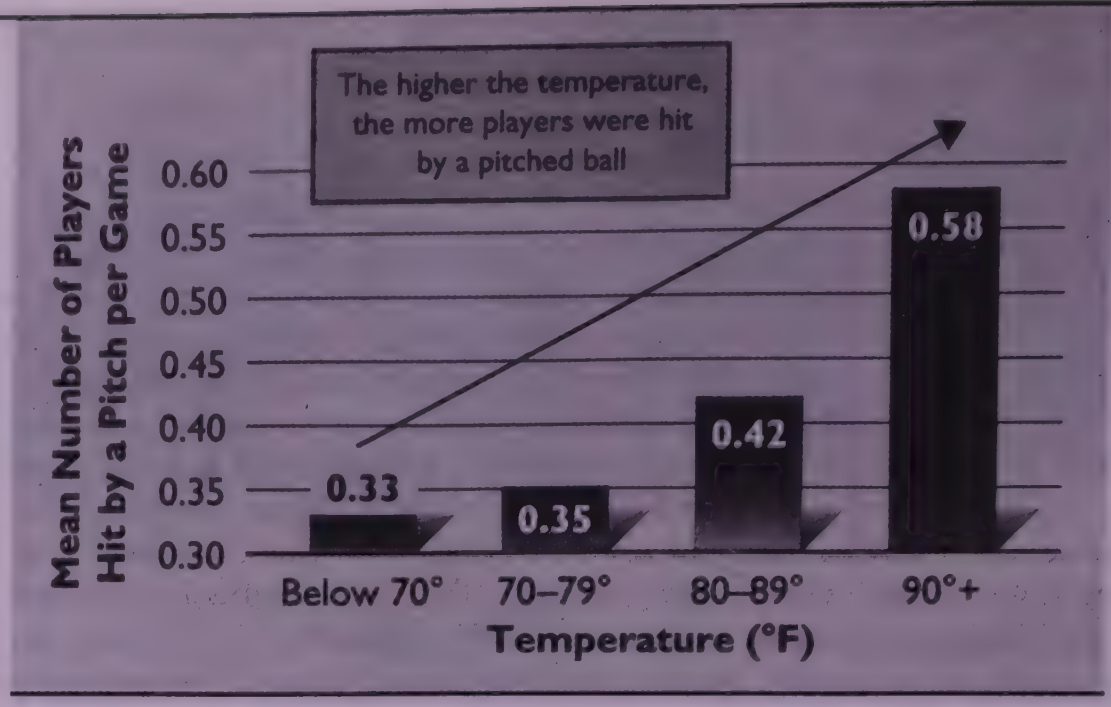
Other research, which examined the relationship between heat and aggression outside the laboratory, pointed to somewhat different conclusions, however. These studies found a correlation between temperature and violent crimes (Anderson & Anderson, 1984; Anderson & DeNeve, 1992). As temperatures rose, so too did the incidence of violent crimes (murder, rape) in many large cities. Moreover, there was no indication of a downturn in crime at very high temperatures. And as shown in Figure 16.14 (on page 668), corresponding effects were even observed on baseball fields: More players were hit by pitched balls on hot days than on cool ones (Reifman, Larrick, & Fein, 1991).

Environmental Psychology: *The branch of psychology that investigates the effects of the physical environment on human behavior and the effects of that behavior on the environment.*

FIGURE 16.14

Heat and Aggression on the Playing Field

As temperatures rise, more batters are hit by pitched balls during major league baseball games. These findings provide indirect support for the existence of a link between heat and aggression.
(*Source:* Based on data from Reifman, Larrick, & Fein, 1991.)



So where does all this leave us? On the one hand, it appears that aggression does increase as temperatures rise. Moreover, such effects seem to occur even as temperatures rise to very high levels—into the 90s Fahrenheit. However, it is also clear that at some point, increasing heat may induce lethargy or even *heat exhaustion*—muscular weakness, nausea, dizziness, and fainting stemming from physiological causes (Sanders & McCormick, 1993). To the extent that individuals experience such effects, of course, their liklihood of engaging in aggression will be reduced. So why didn't field studies of the heat-aggression relationship observe this pattern? Perhaps because people are so good at countering the effects of heat: They drink cold liquids, douse themselves with water, and so on. In the laboratory studies, where aggression did decline at very high temperatures, participants couldn't engage in these tactics, so, perhaps, their discomfort rose to levels high enough to reduce aggression. Additional research is necessary to resolve this issue, but at present one important conclusion is clear: In a wide range of situations and settings, high temperatures can, indeed, contribute to increased aggression.

Effects of Human Behavior on the Environment: What We Are Doing to Planet Earth When I was in junior high school (in the late 1950s), the population of the earth was about three billion; now, it is six billion. As human numbers rise and as more societies industrialize, the impact of human activities on our planet also increases—with perhaps dangerous implications (e.g., Stevens, 1992). Let's consider two of these potential effects.

The greenhouse effect: A coming climatic disaster? Hundreds of millions of automobiles; an ever-increasing number of factories and electricity generating plants that burn coal or oil—some of the effects of these aspects of human activity are obvious (refer to the photo on page 679). Aside from air pollution, however, it is possible that these aspects of human activity could have another, and even more important, effect: The tremendous amounts of *carbon dioxide* released by these and other sources may actually change the global climate. You've probably heard the term *greenhouse effect;* it refers to the fact that carbon dioxide and other gases produced by industry and by the billions of cattle we raise for milk, meat, and leather may serve to trap heat in the earth's atmosphere, thus producing global warming. While scientists do not agree about the size of this effect, most do expect some warming to occur

Increased Use of Fossil Fuels: A Factor in the Greenhouse Effect

Increased use of fossil fuels such as oil and coal may be contributing to rising levels of air pollution and, ultimately, to the *greenhouse effect*.

as a result of human activity (Havel, 1992). The results of such change may be catastrophic. Patterns of rainfall may be altered so that, for example, droughts strike the American Midwest—the true "breadbasket" of the planet—with increasing frequency; the monsoons, which bring needed rain to India and many other countries, may fail; and the Sahara desert may spread over larger areas of Africa. In addition, sea level will rise as the polar ice caps melt, thus producing serious flooding around the world.

Again, scientists don't all agree that such effects are likely; but merely the possibility that they may occur should be enough to spur vigorous action to prevent or at least slow this process. The Earth Summit Conference held in Rio de Janeiro, Brazil, in 1992 represented an attempt to encourage coordinated action by many different nations, and it is clear that additional meetings and concrete actions are necessary if we are to address this serious problem adequately.

How can emissions of carbon dioxide and other gases that contribute to the greenhouse effect be reduced? Primarily through steps that encourage *energy efficiency*: increased insulation in all buildings; more efficient equipment for heating, cooling, and manufacturing processes; and vehicles that deliver more miles for every gallon or liter of fuel used. In addition, increased *recycling* of waste materials is crucial. Paper, glass, metals—all these can be recovered from used products for reuse in new ones. For example, consider one simple fact: In the United States alone, more than 250 million tires are thrown away each year. Until recently, little effort was made to recycle this potentially valuable resource. Now, however, one company—Cycletech, Inc.—has developed a new process in which used tires are frozen and then ground into tiny particles. From these, valuable materials such as rubber, steel, and nylon fiber can be recovered and used in making new products. Since less energy is required to recover and reuse these materials than to make them from scratch, recycling of tires not only removes unsightly "eyesores" from the environment and prevents polluting tire fires, it also helps to reduce energy consumption and thus to slow development of the greenhouse effect.

Destruction of the rainforest and the spread of viral diseases. Each year, millions of acres of virgin rainforest are cut down, either to make room for farming by growing populations or to harvest the timber. The effects of this human activity may also prove catastrophic. Many scientists believe that the rainforests play an important role in moderating the earth's climate, lessening wide swings in temperature or patterns of rainfall (Toufexis, 1992). Perhaps even more important, however, is the fact that as such rainforests are eliminated, contact between humans and animals that once lived within them

is increased. Unfortunately, many of these animals carry viruses to which they are relatively immune, but to which human beings are highly susceptible. For example, consider the *Ebola virus*, unknown to medical science until the 1970s. It first came to the attention of scientists in 1976, when residents of fifty-five villages in Africa near the Ebola River became ill with an unknown disease. More than 88 percent died, and researchers soon determined that the cause was a virus not recognized until that time—a virus that may well have been passed to the human population from animals living in the nearby forest. Efforts to prevent the spread of the virus succeeded, and so the threat of a major epidemic was averted. But this tragic incident raises an alarming question: How many other potentially deadly viruses lurk in the rainforests we are currently destroying? The answer is unknown, but many scientists believe that as the process of cutting down rainforests continues, the risk of human contact with new viruses—and new diseases—will continue to mount (Preston, 1992).

In view of such frightening possibilities, coordinated efforts to deal with this problem seem essential. And, again, there are hopeful signs that such action *is* beginning. For example, organizations have been established for the purpose of purchasing millions of acres of rainforest, not to exploit them, but to preserve them in their natural state forever. If enough actions of this type occur, then perhaps disaster can be avoided—perhaps, but only time will tell whether humanity will pass this ultimate test of its capacity for rational thought and planning.

Making Psychology Part of Your Life

Are You in Love? One Way of Telling

One question almost everyone has pondered is this: "Am I really in love?" Despite many songs suggesting that love is readily visible in one's eyes or on one's face, this is a difficult question to answer. Love has several different components, and one really can't measure it directly!

One answer, however, is provided by systematic research on love and on its various components. Drawing on the findings of such work, social psychologists have devised questionnaires that reliably measure the intense emotional reactions characteristic of romantic love. One of these scales (in modified form) is printed below. Follow the instructions to obtain a rough measure of your own love for any specific person you wish to consider.

Think of a person with whom you believe you are or have been in love. Insert that person's name in each of the statements below and then respond to each by writing a number in the space next to it. Responses to each item are made along the following scale:

Not at all true			*Moderately true*				*Definitely true*	
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*

For example, if you feel that a statement is definitely true, enter a nine; if you feel that it is completely false, enter a one.

After answering all the questions, add the numbers you have entered. The highest score—indicating very intense love—is 120; the lowest is 15.

The items on this scale are based on one developed by Hatfield and Sprecher (1986). They are designed to measure romantic or passionate love. Remember that there are several other kinds of love as well.

____ 1. I would feel deep despair if _____ left me.

____ 2. Sometimes I feel I can't control my thoughts, they are obsessively on _____.

____ 3. I feel happy when I am doing something to make _____ happy.

____ 4. I would rather be with _____ than anyone else.

____ 5. I'd get jealous if I thought _____ were falling in love with someone else.

____ 6. I yearn to know all about _____.

____ 7. I want _____—physically, emotionally, mentally.

____ 8. I have an endless appetite for affection from _____.

____ 9. For me, _____ is the perfect romantic partner.

____ 10. I sense my body responding when _____ touches me.

____ 11. _____ always seems to be on my mind.

____ 12. I want _____ to know me—my thoughts, my fears, and my hopes.

____ 13. I eagerly look for signs indicating _____'s desire for me.

____ 14. I possess a powerful attraction for _____.

____ 15. I get extremely depressed when things don't go right in my relationship with _____.

Systematic research on the nature of romantic love has led to questionnaires designed to measure its characteristics. How do you score?

Summary and Review of Key Points

Social Thought: Thinking about Other People

Key Terms:

social psychology, p. 626
attribution, p. 627
consensus, p. 627
consistency, p. 627
distinctiveness, p. 627
fundamental attribution error, p. 629
self-serving bias, p. 630
social cognition, p. 630
false consensus effect, p. 631
automatic vigilance, p. 632
motivated skepticism, p. 633
counterfactual thinking, p. 634
attitudes, p. 635
persuasion, p. 636
cognitive perspective on persuasion, p. 637
elaboration likelihood model, p. 637
central route, p. 637
peripheral route, p. 637
forced compliance, p. 638
cognitive dissonance, p. 638
less-leads-to-more effect, p. 640

- Attribution is the process through which we seek to identify the causes behind others' behavior. According to a theory proposed by Kelley, we accomplish this task by focusing on information relating to consensus, consistency, and distinctiveness.
- Attribution is influenced by several tendencies that can reduce its accuracy. The fundamental attribution error leads us to overestimate the importance of dispositional causes of others' behavior. The self-serving bias leads us to attribute our own positive outcomes to internal causes, but negative outcomes to external factors.
- Social cognition consists of the processes through which we notice, interpret, remember, and then use social information. These processes are subject to several tendencies that can reduce their accuracy. The false consensus effect leads us to assume that others share our views to a greater extent than is really true. We are especially sensitive to negative social information, a tendency known as automatic vigilance. In general, we are much more open to information consistent with our initial preferences than information inconsistent with these preferences; this is known as motivated skepticism.
- Engaging in counterfactual thinking—imagining events and outcomes that didn't occur—can affect our interpretation of the events that actually did occur and our subsequent decisions or judgments concerning these outcomes.
- Attitudes, lasting beliefs about and evaluations of aspects of the world, play an important role in many aspects of social thought.
- Early research on persuasion focused primarily on how aspects of the source, the message, and the audience influence this process. Modern cognitive models of persuasion, such as the elaboration likelihood model, emphasize the role of cognitive processes.
- When individuals notice that attitudes they hold or their attitudes and their behavior are inconsistent, they experience cognitive dissonance. This state, in turn, can lead to attitude change. Providing individuals with small rewards for expressing views they don't really hold sometimes leads to greater attitude change than providing them with relatively large rewards—the less-leads-to-more effect.

Social Behavior: Interacting with Others

Key Terms:

prejudice, p. 643
realistic conflict theory, p. 643
social categorization, p. 643
stereotypes, p. 644
contact hypothesis, p. 645
recategorization, p. 646
racial identification, p. 647
social influence, p. 649
conformity, p. 649

- Prejudices, negative attitudes toward members of specific social groups, stem from many different sources. These include economic competition between the groups, social categorization, social learning, and cognitive factors such as stereotypes.
- Prejudice can be reduced by socialization of children for tolerance, greater intergroup contact, and recategorization—shifting the boundaries between ingroups and outgroups so as to include people previously excluded from one's own group.
- Social influence, or attempts to change others' behavior, takes many different forms. Social norms often exert strong pressures toward conformity. Group size and the unanimity of the influencing group are factors in conformity, but gender is not. Compliance is often gained through techniques such as ingratiation, or through multiple requests, as in the foot-in-the-door or door-in-the-face techniques. Adding a small extra incentive often increases compliance through the that's-not-all effect. Finally, compliance can often be gained through complaining.

social norms, p. 649
compliance, p. 653
ingratiation, p. 653
impression management, p. 653
foot-in-the-door technique, p. 654
door-in-the-face technique, p. 654
that's-not-all approach, p. 654
complaining, p. 654
obedience, p. 655
prosocial behavior, p. 658
bystander effect, p. 660
diffusion of responsibility, p. 660
love, p. 662
interpersonal attraction, p. 662
propinquity, p. 662
repeated exposure effect, p. 662
romantic love, p. 664
companionate love, p. 664
environmental psychology, p. 667

- Obedience is a form of social influence in which one person follows direct orders from another. Research findings indicate that many people will obey commands to harm another person. Destructive obedience is reduced by exposure to disobedient models, acceptance of personal responsibility, and evidence that authority figures are seeking selfish ends.
- Prosocial behavior involves actions that benefit others without necessarily providing any direct benefit to the persons who perform them.
- The more witnesses present at the scene of an accident, the less likely the victim is to receive aid; this is known as the bystander effect.
- Other influences on helping include current moods, beliefs, and personal characteristics of potential helpers.
- Interpersonal attraction, our liking for others, is influenced by many different factors. Among the most important of these are propinquity, similarity, reciprocity, and physical attractiveness.
- Several types of love exist, including passionate love, which is dominated by strong physical attraction, and companionate love, which emphasizes commitment and concern for the loved one's well-being. Several conditions must be met before people conclude that they are in love: strong emotional arousal, the presence of an appropriate love object, and presence of the cultural concept of love. Biological processes may play a role in both passionate and companionate love.
- Several factors can lead to the dissolution of romantic relationships. These include jealousy, boredom, growing dissimilarity between the persons involved, and a pattern in which negative statements and interactions replace positive ones. All of these factors are lessened or prevented in happy long-term relationships.
- The field of environmental psychology investigates how the physical environment influences behavior and how human behavior affects the environment. Aspects of the physical environment such as temperature, noise, and air quality influence many aspects of social behavior. For example, research findings indicate that aggression increases as temperature rises. Human behavior appears to be influencing global climate through the greenhouse effect. Destruction of the rainforest may bring human beings into contact with viruses for which they have little or no immunity.

Critical Thinking Questions

Appraisal	Social thought and social interaction occur together in a seamless fashion in everyday life. Do you think that studying them separately, as social psychologists have often done, makes any sense? If so, why? If not, how could they be studied simultaneously?
Controversy	Many people believe that love is beyond the realm of science—that we will never be able to understand it fully through scientific research. Do you agree? Or do you think that love can be investigated in a systematic manner through the methods of modern psychology?
Making Psychology Part of Your Life	Now that you know more about the many techniques people use to influence each other, do you think that you can use this information to (1) be more effective in exerting influence over others and (2) resist such influence yourself? What techniques do you think might be most useful to you in your own life? Which do you feel might be hardest to resist when used by other persons?

Psychology Goes to Work:

Industrial/Organizational Psychology and Human Factors

INDUSTRIAL/ORGANIZATIONAL PSYCHOLOGY: THE SYSTEMATIC STUDY OF BEHAVIOR IN WORK SETTINGS 677
- *Work Motivation: Theories and Techniques*
- *Performance Appraisal: Tying Rewards to Performance*
- *Work-Related Attitudes: The Prevalence, Causes, and Effects of Job Satisfaction*
- *Leadership: Its Nature and Impact*

HUMAN FACTORS: DESIGNING FOR EFFECTIVENESS AND SAFETY 703
- *Visual Displays: Principles and Applications*
- *Controls: "What Happens When I Turn This Dial . . . ?"*
- *Workplace Environments: Planning for Productivity and Well-Being*

MAKING PSYCHOLOGY PART OF YOUR LIFE
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THE POINT OF IT ALL
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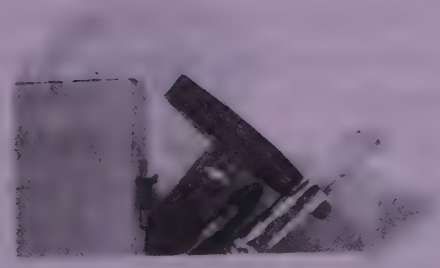
17



What one activity occupies more of your time than any other? In chapter 4, we saw that a possible answer is sleep, and for young persons who sleep eight, nine, or even more hours daily, this may be true. After we leave school and launch our careers, however, another answer seems more accurate: *work*. Most adults spend more of their time on work-related activities—commuting to and from work, doing their jobs, working on materials they have brought home with them—than on anything else. Further, for many of us, our job or occupation becomes a key part of our self-concept (Meyer, Allen, & Smith, 1993). When asked "Who are you?" many respond in terms of job or career: "I'm an engineer," "a secretary," "a dentist," "a salesperson" (Greenberg & Baron, 1995). And though many people complain loud and long about the necessity of working, most simply can't imagine life without a job or some form of productive work.

Work: A Central Part of One's Self-Concept

When asked "Who are you?" many people reply in terms of their occupation. Work-related activities play a central role in most people's lives.

Given the importance of work in our lives, it is far from surprising that this topic has long been of interest to psychologists. In fact, work is the focus of two important subfields of psychology. One of these, **industrial/organizational psychology** (I/O psychology, for short), focuses on all aspects of behavior in work settings and on the nature of work settings themselves. Thus, it examines such issues as the recruitment, selection, and training of individuals for specific jobs; techniques for increasing work motivation; systems for recognizing and rewarding good performance; and the attitudes people hold toward their jobs.

The second related subfield, known as **human factors,** has a somewhat different focus. *Human factors psychologists* attempt to discover and apply information about human abilities and limitations (for example, sensory abilities and cognitive limitations) to the design of tools, systems, tasks, and working environments in order to enhance the safety, productivity, and comfort of the people who use them. If you find the controls on your VCR confusing or have trouble remembering which knob on your stove controls which burner, you can readily understand how important it is to consider human abilities and limitations in designing anything people will use. (The field of human factors is often referred to as *ergonomics* outside the United States.)

FOR MANY OF US, OUR JOB OR OCCUPATION BECOMES A KEY PART OF OUR SELF-CONCEPT.

One more point: although the fields of I/O psychology and human factors are distinct branches of psychology, they overlap in important ways. Both fields share a basic interest in factors affecting task performance, both recognize the importance of cognitive abilities and processes in work-related activities, and both share an interest in the physical layout and design of workplaces. We'll explore several other connections between these fields in later sections.

Industrial/Organizational Psychology: *The branch of psychology that studies all aspects of behavior in work settings and the nature of work settings themselves.*

Human Factors: *The branch of psychology that applies basic knowledge about human abilities and limitations to the design of tools, equipment, systems, and products.*

Since I/O psychology and human factors are related, it seems reasonable to consider them together. In this chapter, therefore, we'll focus on some of the major findings of the two fields. Beginning with *I/O psychology*, we'll examine four important topics: *work motivation*—motivation focused on the performance of a job or task; *performance appraisal*—techniques for evaluating people's performance and providing them with feedback; *work-related attitudes*—attitudes people hold toward their jobs and the organizations for which they work; and *leadership*—the process through which leaders influence group members toward attainment of specific group goals. Effective leadership is an important determinant of performance in many work groups, so this has long been an issue of considerable interest to I/O psychologists.

Following discussion of these topics, we'll turn to the field of *human factors*. Here, we'll consider the design of *displays*—ways in which informa-

tion about equipment or systems can be provided to the persons operating them—and the design of *controls* for various tools or systems. For these topics, we'll look at the important links between effective design and both performance and safety. Finally, we'll consider several aspects of *workplace design*—how offices and other work environments can be built or altered to enhance the performance and well-being of their occupants.

INDUSTRIAL/ORGANIZATIONAL PSYCHOLOGY: *The Systematic Study of Behavior in Work Settings*

Although I had various part-time jobs from the time I was fourteen, my first full-time job was one I held during the summer after high school graduation. It was a clerical job in the office of a large labor union, and it was, in a word, boring. In those days the work week was a full forty hours, so I'd arrive every morning before 8:00 a.m. and would leave precisely at 5:00 p.m. The hours in between were truly mind-numbing. Since I was a summer fill-in, I was given only the most tedious tasks to perform. These consisted mainly of filing various letters and forms, so each day I'd stand for hours in front of a long line of file cabinets. I soon discovered that I could finish this work in about two hours. If I did, though, there was nothing else for me to work on that morning or, sometimes, for the rest of the day. The result: I had to learn to work in slow motion and literally to turn off my brain so that I could stand there hour after hour as the clock laboriously ticked away the minutes. The only high points in the day were my fifteen-minute breaks at mid-morning and mid-afternoon, and my one-hour lunch. I needed the money for college, so I stuck it out for the entire summer. But what a relief when the fall finally came and I could go back to school!

What was wrong with that job? From the perspective of I/O psychology, practically everything. As I look back, it's as though the job had been designed to *reduce* my motivation, create negative attitudes toward the organization, and undermine my performance in every way possible. Let's take a closer look at each of these effects to see how, from the perspective of I/O psychology, the situation could have been greatly improved.

WORK MOTIVATION: *Theories and Techniques*

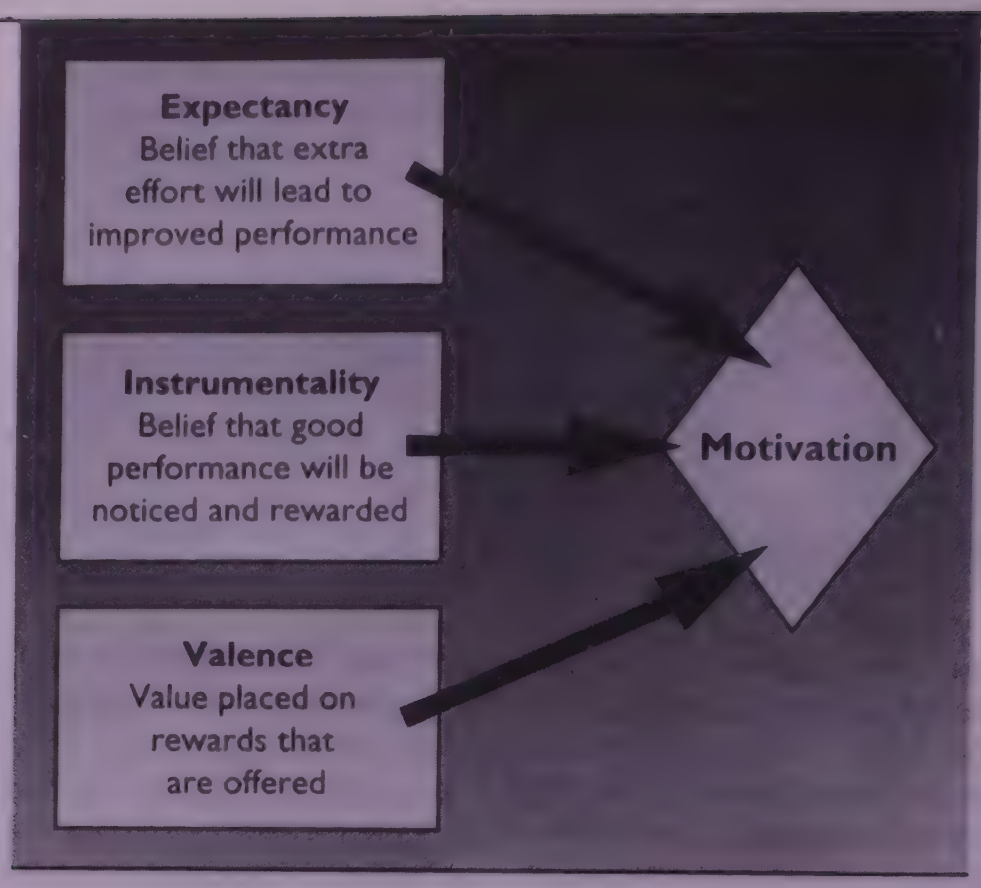
Every organization, from Microsoft and Apple to the Salvation Army and the Scouts, wants and needs a motivated workforce. Unless people are willing to expend effort in performing their jobs, little or nothing will get done, and what is accomplished may be low in quality. A basic question relating to work and work settings, then, is this: How can individuals be motivated to expend such effort—to work hard at their jobs, whatever these are?

I/O psychologists believe that in order to answer this question, we must first understand the basic nature of motivation generally, and work motivation in particular. As in all branches of psychology, this quest for understanding involves efforts to construct and test valid theories of work motivation. We have already considered several theories closely related to this issue in chapter 10. You may recall that that chapter described *need theories*, such as the one proposed by Maslow, and *expectancy theory*. As we saw in chapter 10, both of these theories have been applied to understanding work motivation.

FIGURE 17.1

Expectancy Theory: An Overview

Expectancy theory suggests that work motivation is strongly affected by three factors: *expectancy*, *instrumentality*, and *valence*.



In fact, expectancy theory (Mitchell, 1983; Vroom, 1964) is currently one of the most important approaches to understanding work motivation. As I hope you'll recall, this theory suggests that the motivation to engage in any activity is a function of *expectancy*—our belief that effort will result in improved performance; *instrumentality*—our belief that good performance will be recognized and rewarded; and *valence*—the perceived value of the rewards we expect to receive (see Figure 17.1).

Expectancy theory has been evaluated in many different studies (e.g., Klein, 1991; Tubbs, Boehne, & Dahl, 1993); and in general, results confirm its accuracy: People *do* seem to work hardest when they believe that doing so will improve their performance, when they expect that good performance will be rewarded, and when they value the rewards offered for such performance. In contrast, they are much less likely to expend effort on their jobs when any one of these ingredients is missing (Greenberg & Baron, 1995). From the point of view of expectancy theory, of course, my summer job was a disaster. I knew that working harder would *not* improve my performance—it would simply lead to greater boredom. Further, if I did improve my performance, it was clear to me that no one cared and that I would *not* be rewarded for such gains. The result: my motivation sank to extremely low levels.

Now that we've briefly reviewed expectancy theory, let's turn to two other approaches proposed by I/O psychologists.

GOAL-SETTING THEORY Suppose that you are studying for a big exam. Do you ever tell yourself in advance that you won't stop until you have read a certain number of chapters, solved a fixed number of problems, or memorized some number of definitions? The chances are good that you do, because most people realize that they often accomplish more when they have a concrete goal in mind than when they do not. This basic fact lies at the center of one major approach to understanding work motivation, **goal-setting theory** (Locke & Latham, 1990).

Goal-Setting Theory: *A theory that explains why setting specific, challenging goals for a given task often leads to improvements in performance.*

Actually, goal-setting theory did not begin as a theory; rather, this is one of those cases in which an interesting research finding occurred first, and then a theory was constructed to help explain it. The research finding in question

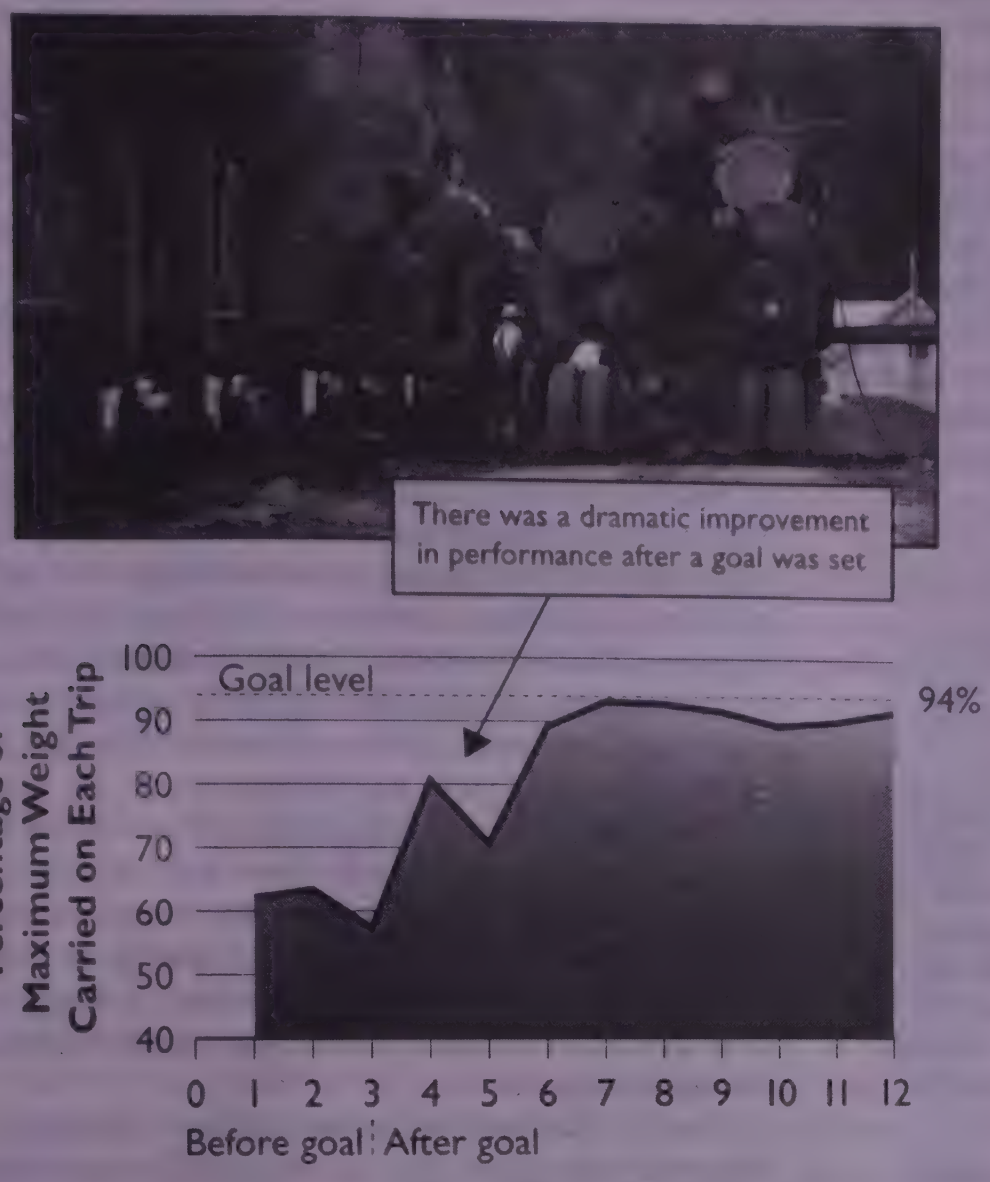


FIGURE 17.2

Goal Setting: An Illustration of Its Effects

As shown here, performance improved sharply after a specific, challenging goal was set for loading giant logging trucks. Moreover, these gains were still present in a follow-up study conducted seven years later.
(*Source:* Based on data from Latham & Baldes, 1975.)

was both straightforward and impressive: On a wide variety of tasks, people performed better when they were given specific goals than when they were simply told to "do your best" (Wood & Locke, 1990). The "impressive" part of the equation was apparent in the size of the gains in performance: In many instances, people did *much* better when working toward specific goals than when such goals were absent. For example, consider a famous study conducted by Latham and Baldes (1975).

The participants in this project were lumber-camp crews who hauled logs from forests to the nearby sawmill. Before the study began, it was found that crews loaded the log-hauling trucks to only about 60 percent of capacity. This was very wasteful, because the trucks were huge and used tremendous amounts of fuel. To change this situation, Latham and Baldes set a specific goal of the loggers: to load the trucks to 94 percent of capacity before driving them to the mill. What happened? The crews quickly improved their performance to this level and then maintained it; see Figure 17.2. In fact, in a follow-up study seven years later, they were still loading the trucks to near capacity!

Notice, by the way, that in this study as in many others, *challenging* goals were set—ones that made people reach to attain them. In general, these are more successful than easy goals. However, to be effective in increasing performance, goals must also seem attainable. If they are totally out of reach, they are likely to be ignored. In addition, it is important that goals be specific—the more specific the better. Merely saying "Do better!" is *not* a good way to proceed. Far more helpful is some specific, quantifiable goal, such as a

10 percent increase in sales or a 25 percent reduction in errors. Finally, it's also important that goals be accompanied by feedback, so that people can know whether and to what extent they are making progress toward the goals. When these conditions are combined, goal setting can be a highly effective technique for increasing motivation and performance. (All of these conditions existed in the Latham and Baldes study, by the way.)

But *why*, precisely, is goal setting so effective in increasing performance? A theory proposed by Locke and Latham (1990) provides one answer. According to this theory, goals increase motivation for several reasons. First, they lead people to compare their present performance with the goal. To the extent that individuals fall short of the goal, they feel dissatisfied and work harder to attain it—as long as they believe that it is possible for them to do so.

Second, when individuals succeed in reaching a goal, they feel competent and successful; such feelings are desirable and can serve as a strong incentive to extra effort. Third, the existence of a goal clarifies what level of performance is required. Once this level is established, individuals can focus on developing effective strategies for attaining it. Without a clear goal, of course, it is much more difficult to devise such strategies.

The theory also calls attention to the important role of *self-efficacy*—individuals' beliefs about their ability to perform at given levels. If people conclude that no matter what they do, they lack the capacity to reach a certain goal, then effort and performance will decrease. In contrast, if they conclude that they *can* reach the goal, motivation and performance will be strongly enhanced.

Finally, goal-setting theory indicates that goals will guide behavior only when they are personally accepted by the persons in question. Thus, setting goals that others don't accept is *not* an effective way of enhancing their performance. Similarly, if you set a goal that *you* don't really accept, such as "Lose twenty pounds before summer," the effects of this goal on *your* behavior will be minimal.

In sum, goal-setting theory suggests that specific, challenging, but plausible goals can and often will increase motivation. Indeed, literally hundreds of studies on goal setting indicate that it is, perhaps, the single most effective means of attaining *that* goal.

KEY POINTS

- Industrial/organizational psychology studies all aspects of behavior in work settings and the nature of work settings themselves.
- Work motivation plays an important role in the performance of many work-related tasks. Expectancy theory suggests that people will expend effort on various tasks only to the extent that they expect such effort to improve performance, believe that good performance will be rewarded, and desire the rewards offered.
- Goal setting, the process of establishing clear goals for various tasks, often greatly increases performance. Goal-setting theory proposes that the beneficial effects of goal setting stem from several factors, including comparisons between present performance and the goal, feelings of self-efficacy, clarification of expected performance, and improved strategies for task performance.

EQUITY THEORY: FAIRNESS AND MOTIVATION When I described that summer job that I held many years ago, I left out one important detail. My salary for forty hours of work each week was $56 (this was back in 1960). For that sum, I was expected to be there on time, to stay until 5:00 p.m., and to hold my breaks to fifteen minutes each. There was another college student working there that summer, and I soon noticed that he rarely arrived on time and often disappeared for hours at a stretch in the middle of the day. To add insult to injury, he was also being paid $10 a week more than I was. True, he was a year ahead of me in school, but did this qualify him for so many perks? No way! So how could he get away with it? I soon found out: He was the son of the union's treasurer. Needless to say, this was the last straw. Any remaining motivation I might have had relative to this job flew out the window.

Equity Theory: A theory suggesting that individuals compare the ratio of their inputs and outcomes in any relationship with the ratios of other persons. If these ratios are not approximately equal, they may experience feelings of inequity, which can reduce work motivation.

This was my first brush with *unfairness*—what I/O psychologists term *inequity*—in the workplace. And it brings us to another important theory of work motivation, **equity theory** (Cropanzano & Randall, 1993; Greenberg,

1990). The central issue in equity theory is *perceived fairness*—individuals' beliefs about whether they are being treated fairly or unfairly by others. The theory suggests that people are deeply concerned with this issue, and this suggestion certainly fits with everyday experience: In general, we seem to be extraordinarily sensitive to this issue. How do we determine whether we are being treated fairly or unfairly? Equity theory suggests that we begin by engaging in *social comparison:* We compare ourselves with others. Specifically, we compare the ratio of our own *inputs* and *outcomes*—what we contribute and what we receive—to the corresponding ratio for other persons whom we select for comparison (Kulik & Ambrose, 1992). We don't choose just anyone for such comparisons, of course. As a beginning employee, for example, I didn't compare my inputs and outcomes with those of the head of the department. Rather, I compared myself with someone I viewed as similar to me in important respects—the other summer employee.

Equity theory suggests that if the ratios of inputs provided to benefits obtained are about equal for ourselves and these other comparison persons, we perceive our treatment as basically fair. If these ratios are somehow out of balance, however, we conclude that we are being treated unfairly; then a state known as *inequity* develops. This is an uncomfortable, negative feeling, and one of its consequences is often a sharp drop in motivation. This is what I experienced in my summer job. As shown in Figure 17.3, my inputs and those of the other student were roughly equal; if anything, mine were larger. Yet his outcomes were considerably greater than mine.

It's important to bear in mind that inequity rests largely in the eyes of the beholder. Each person makes her or his own judgment about the relative magnitude of her or his inputs and outcomes and those of others. And different people can certainly differ in their views of such matters; it's quite possible, for example, for each person to feel that she or he is contributing more than the other. Also, feelings of inequity can arise in two very different situations. In the first, we feel *underrewarded* relative to others: We conclude that we are getting less than they are in a relative sense. In the second, we feel

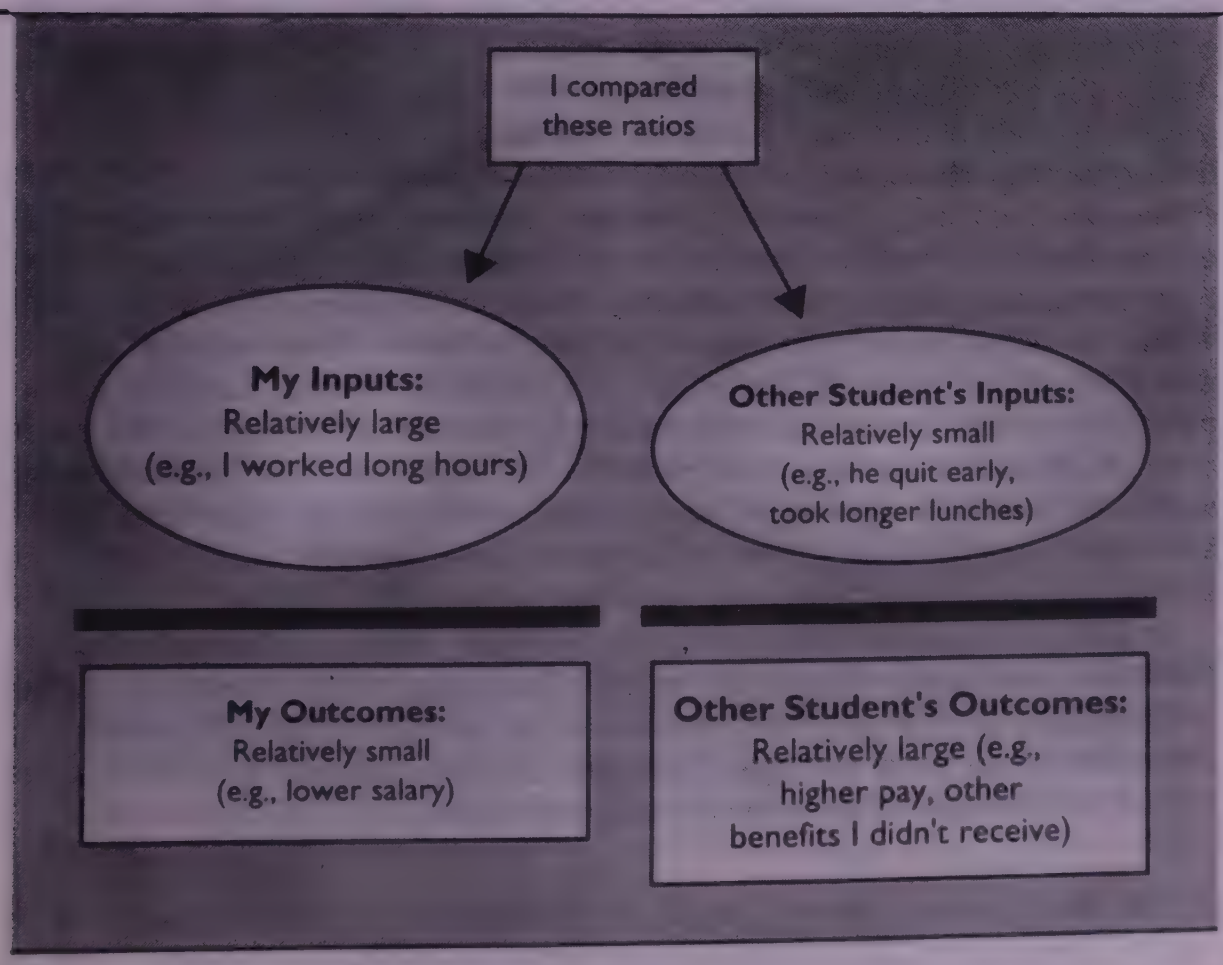


FIGURE 17.3

Equity and Inequity

Equity theory predicts that individuals will experience feelings of *inequity*—unfairness—when the ratio between what they provide to a relationship (inputs) and what they receive (outcomes) is not similar to the ratio for comparable persons. As shown here, these are the conditions I faced in my first full-time job: I worked longer hours than the other student, yet he received higher pay.

overrewarded relative to others: We believe that we are getting *more* than they are in a relative sense. For example, perhaps the other student felt this way about me, since he was doing less work *and* receiving more pay. As you can probably guess, however, we are far less sensitive to this second kind of inequity (Cropanzano, 1993). When we receive a more favorable inputs-to-outcomes ratio than others, we tend to explain this away and perceive ourselves as somehow deserving of these extra benefits. This is one more illustration of the *self-serving bias* we encountered in chapter 16.

Why do feelings of inequity interfere with work motivation? Equity theory suggests the following answer: When individuals perceive themselves as receiving less than they deserve and experience feelings of inequity, they can take any one of several steps to reduce such feelings. One possibility is to try to increase one's outcomes: to ask for a raise, a bonus, or other some other benefit. Another is to leave the relationship: to quit and find another job. Still a third is to reduce one's inputs: to expend less effort on the job. Many studies indicate that this last tactic is a very common reaction to feelings of being underrewarded; that is, persons who conclude that they are being underrewarded reduce their performance relative to others who feel that they are being treated fairly (Pritchard, Dunnette, & Jorgenson, 1972). Such effects have even been observed among professional basketball players: Those who are underpaid relative to their performance (in comparison to their fellow players) actually score fewer points than those who are equitably paid (Harder, 1992).

Reduced performance is not the only way in which employees can demonstrate lowered work motivation, however. In addition, they can attempt to balance the scales by engaging in hidden actions that provide them with extra benefits. Perhaps the most revealing evidence on such effects is provided by a study conducted by Greenberg (1990).

This investigation involved three different manufacturing plants. In two, poor economic conditions made it necessary for management to lower employees' pay by 15 percent. In the third, business was better, so no pay cut was necessary. In one of the two plants where a pay cut was required, management gave employees a very thorough explanation of why this step was essential, showed a considerable amount of concern over the cut, and expressed sympathy for the employees (this was the *adequate explanation* condition). In the other plant where there was a pay cut, management gave employees only a brief explanation of why this was being done and showed little sympathy for the hardships the cut would cause (this was the *inadequate explanation* condition). Greenberg reasoned that employees in the inadequate explanation plant would experience much stronger feelings of inequity than those in the adequate explanation plant. Thus, employees in the former plant would be more likely to engage in efforts to reduce these feelings. While efforts to reduce inequity can take many different forms, Greenberg employed an unusual measure in this research: the amount of theft of company tools, supplies, equipment, and products by employees. He predicted that such theft would be greater in the inadequate explanation plant than in the adequate explanation plant or in the plant where no pay cut occurred. As shown in Figure 17.4, this is precisely what happened.

In sum, when individuals conclude that they are being treated unfairly, their work motivation decreases sharply. This suggests that there are important practical, as well as ethical, reasons for ensuring that fairness is standard procedure in all work settings. Please see the Key Concept feature on page 684 for an overview of theories of work motivation.

Work Motivation: How Can It Be Enhanced? I/O psychology is an applied field as well as an important branch of scientific psychology. Thus, at

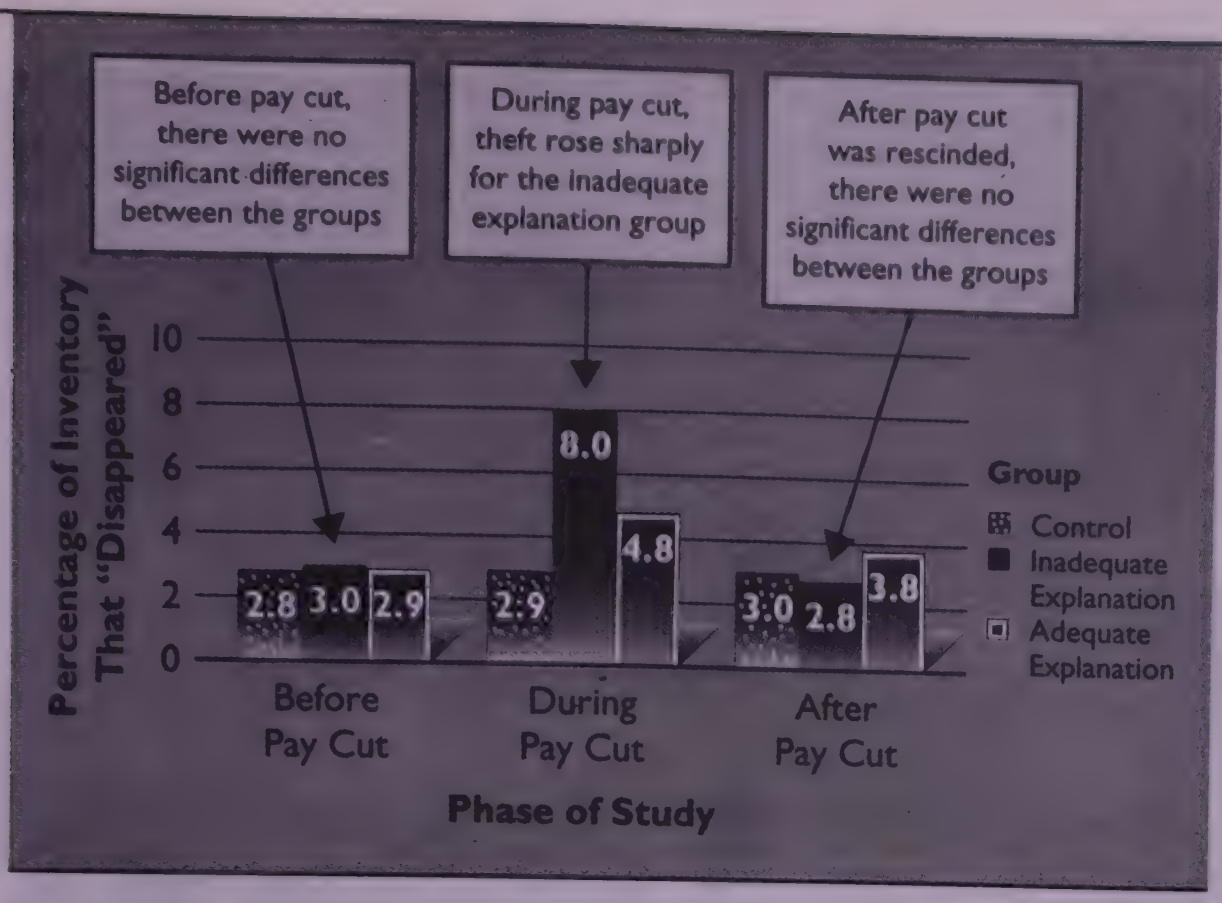


FIGURE 17.4

Employee Theft: One Reaction to Feelings of Inequity

Theft of company property increased among employees who received a pay cut without a clear explanation of why this was necessary. In contrast, theft increased to a much lesser degree among employees who were given an identical pay cut but who received a clear explanation for this action. (*Source:* Based on data from Greenberg, 1990.)

the same time that they have sought to understand the basic nature of work motivation, I/O psychologists have also focused on the practical task of devising procedures for increasing such motivation. Several of these procedures are closely linked to theories we have already considered. For example, *goal setting* is a highly effective means of increasing motivation, and performance, in a wide range of contexts (e.g., Locke & Latham, 1990). Similarly, principles derived from expectancy theory have been found to be effective when applied in many work settings. For example, many companies have found that **cafeteria-style benefit plans**—ones in which employees can choose the rewards they will receive for good performance, such as improved medical or life insurance or more vacation time—have been very successful. These plans allow each employee to select the rewards she or he prefers and thus maximize *valence*—an important component in expectancy theory (e.g., Stern & Stewart, 1993).

Other approaches to enhancing work motivation, however, derive from different principles. The most important of these approaches involves techniques relating to **job design**—efforts to make jobs more interesting and appealing to the persons who perform them (Griffin & McMahan, in press). Many job-design techniques exist, but the ones that have received most attention are *job enlargement* and *job enrichment*. **Job enlargement** means expanding jobs—especially dull, repetitious ones—to include a larger variety of different tasks at the same level of skill. For instance, consider people working at a greeting-card company, designing birthday cards. Their jobs could be enlarged to include work on cards for other occasions, and perhaps on humorous coffee mugs as well. Recent studies indicate that job enlargement can yield increased motivation among employees, at least temporarily (Campion and McClelland, 1991). Once employees get used to their enlarged jobs, though, these benefits may decrease, so job enlargement is not a one-step process; rather, it may be necessary to redesign jobs periodically to increase their appeal.

In contrast, **job enrichment** involves giving employees not only more tasks to perform, but ones at higher levels of skill and responsibility. Thus,

Cafeteria-Style Benefit Plans: *Pay plans that permit employees to choose the specific fringe benefits they prefer.*

Job Design: *Efforts to make jobs more motivating to the persons who hold them by making them more interesting and appealing.*

Job Enlargement: *Adding more varied tasks, at the same level of responsibility or skill, to a given job.*

Job Enrichment: *Expanding a given job to include additional tasks at higher levels of skill or responsibility.*

KEY CONCEPT

Theories of Work Motivation

Need Theory

Individuals will work hard only if their basic (deficiency) needs are met; for example, physiological needs, needs for safety.

The removal of harmful substances such as asbestos from homes, schools, and factories contributes to satisfaction of our safety needs.

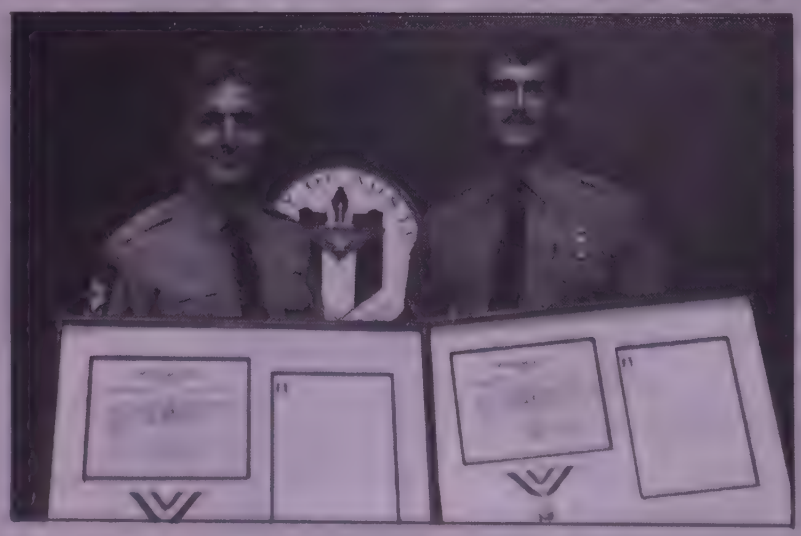
Goal-Setting Theory

Individuals will work hard when they have accepted challenging goals, compare their present performance with these goals, and believe that they can perform at the levels needed to reach these goals.

When individuals work toward concrete goals, their performance—and achievement—is often improved.

Expectancy Theory

Individuals will work hard only to the extent that they believe effort will improve performance, believe good performance will be rewarded, and value the reward offered.



According to expectancy theory, rewarding individuals for excellent performance is an important means of increasing their motivation.

Equity Theory

Individuals will work hard only to the extent that they believe they are being treated fairly.

When individuals believe that they have been treated unfairly, they may take actions designed to correct this situation—to restore fairness.

job enrichment offers employees the opportunity to exert greater control over how their jobs are done. For example, work teams in many manufacturing plants are now permitted to decide how they will perform various tasks; they are not simply told how to do them by a manager.

In sum, job design is a useful means for enhancing work motivation. Like all such procedures, it offers no guarantee of success. Still, at this time of rising international competition, the potential benefits of increasing individuals' work motivation are so great and so important that motivational efforts by I/O psychologists seem likely to continue in the years ahead. For a discussion of one highly controversial technique for increasing productivity, perhaps through increments in motivation, please see the **Point of It All** section below.

One final point: throughout this discussion we have focused on ways of increasing motivation. The underlying assumption is that increments in motivation will lead to improvements in performance. Often this is true. But it is important to recognize that there is no hard-and-fast relationship between motivation and performance. This is because motivation is only one of many different factors affecting performance. Thus, even if motivation increases, performance may not rise, because of the impact of these other variables. For example, increased motivation will not lead to improved performance if the employees in question lack necessary skills. If you've ever tried to use a new computer program without the manual, you've had firsthand experience with this fact. Alternatively, if people are already performing at very high levels, increased motivation may fail to improve performance even further: There's simply no room for additional gains. So please remember: Increased motivation is an important contributor to improved performance, but it by no means guarantees it.

Key Points

- Equity theory suggests that people compare the ratio of their own inputs and outcomes to the ratio of inputs and outcomes for other persons comparable to themselves. If these two ratios are unequal, feelings of inequity may arise.
- In addition to formulating theories of work motivation, I/O psychologists have focused on devising techniques for enhancing such motivation. Such procedures include job design, especially the techniques of job enlargement and job enrichment.

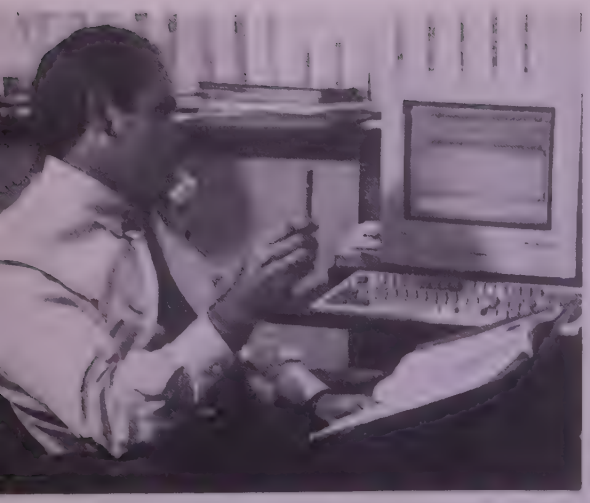
The Point of It All

Computer-Based Work Monitoring: Maybe Big Brother Is Watching After All—through the Computer

Twenty or even fifteen years ago, the idea that millions of persons would have computers on their desks seemed far-fetched, to say the least. Now, however, this is reality. Tens of millions of personal computers (PCs) and workstations are in use in the United States alone, and the number increases by several millions each year. Computers are powerful tools for performing many jobs, and this is how they have primarily been used. But because many jobs involve constant use of computers—for example, to enter or retrieve data for billing, inventory control, and so on—another possibility arises: Perhaps computers can be used to monitor employees' performance and thus to increase their motivation.

Proponents of **computer-based work monitoring** contend that it can indeed enhance motivation and thereby boost performance. After all, what employee, knowing that her or his every keystroke is being recorded by a central computer, would slack off during the day? Further, such information can

Computer-Based Work Monitoring: *Use of computers to monitor the performance of employees.*



COMPUTER-BASED WORK MONITORING: AN EFFECTIVE WAY TO ENHANCE PERFORMANCE?

A growing number of companies have adopted computer-based monitoring of their employees' work. Existing evidence suggests that this technique may improve performance on simple tasks but interferes with performance on more complex tasks.

be used to provide immediate and accurate *feedback* to employees—something that both expectancy theory and goal-setting theory view as a major plus where motivation is concerned.

On the other side of this issue are critics of computer-based monitoring, who contend that it represents an invasion of privacy, induces high levels of stress among employees, and generates reduced levels of satisfaction, morale, and teamwork (Aiello, 1993). Who will take time to help a fellow employee under conditions where the time spent away from one's keyboard will be recorded, to the hundredth of a second, for one's boss to see?

While this argument continues, many companies have adopted computer-monitoring procedures. In fact, by 1990, more than 10 million employees in the United States were being monitored in this manner as they worked (Halpern, 1992). Do such procedures work? Psychologists have only just begun to study this question. Results to date have been mixed. Some studies have reported improvements in performance (Nebeker & Tatum, 1993), but others have reported decrements in performance and corresponding increments in stress and feelings of anxiety (Aiello & Svec, 1993).

While it is too early for firm conclusions, one possible interpretation that seems to fit most of the existing evidence is as follows: Computer monitoring of performance has effects similar to those resulting from the presence of other persons—effects described in psychology by the term **social facilitation** (e.g., Geen, 1989). Research on social facilitation indicates that the presence of others tends to improve performance on simple or well-learned tasks, but to impair performance on complex tasks or ones still being learned. And this is the pattern of findings obtained in many studies concerned with the effects of computer monitoring of work (Aiello & Svec, 1993). Performance is improved on simple tasks such as entering simple information through a keyboard (Nebeker & Tatum, 1993) or coding single digits (Griffith, 1993), but reduced on more complex ones such as solving anagrams (unscrambling scrambled words).

If additional research replicates this pattern of findings, then we may reasonably predict that aside from ethical and legal issues, computer-based monitoring of work *can* sometimes improve performance. However, these procedures can also reduce performance on some tasks, so it is clear that they should be used with caution, and only when the kind of task being performed and many other factors are taken into account. Further, even if work monitoring improves performance, it is not clear that such effects stem from increments in work motivation. Rather, they may derive primarily from increased anxiety and activation—factors that can sometimes improve performance on relatively simple tasks. In short, the jury, both legal and scientific, is still out where these procedures are concerned. The best advice currently available would seem to be "Proceed with caution."

PERFORMANCE APPRAISAL: Tying Rewards to Performance

Social Facilitation: *Effects on behavior stemming from the mere presence of others.*

Performance Appraisals: *Annual or semiannual evaluations of employees' performance coupled with feedback about the ratings they have received.*

Years ago, New York City had a mayor whose favorite question to reporters and to audiences at his speeches was "How am I doing?" And Mayor Koch was certainly not alone in wanting feedback on his performance: We all want to know how we're doing with respect to many areas of life. In organizations such feedback is often provided by means of formal **performance appraisals**—annual or semiannual ratings of employees' performance, coupled with feedback about the ratings they receive (Balzer & Sulsky, 1990; DeNisi, Cafferty, & Meglino, 1984).

As you can guess, evaluating employees is a difficult and tricky process. As noted in chapter 16, thinking about other persons is a complex task. Moreover, because of our tendencies to take cognitive shortcuts and exert the least amount of cognitive effort possible, we often make serious errors in reaching conclusions about others and the causes behind their actions (e.g., Ditto & Lopez, 1992; Macrae, 1992). Clearly, we wish to avoid such errors in evaluating others' performance; since their raises, promotions, and entire careers depend on the outcome, the stakes are truly very high. In fact, we want to make such ratings as accurate and reliable as possible. How can this task be accomplished?

I/O psychologists have studied this question for many years, and the results of their research provide some intriguing answers. In this discussion of performance appraisal, therefore, I'll first describe some of the potential errors that can occur when we face the task of evaluating others. Then I'll describe some techniques that help to reduce these errors and improve the accuracy of the ratings obtained.

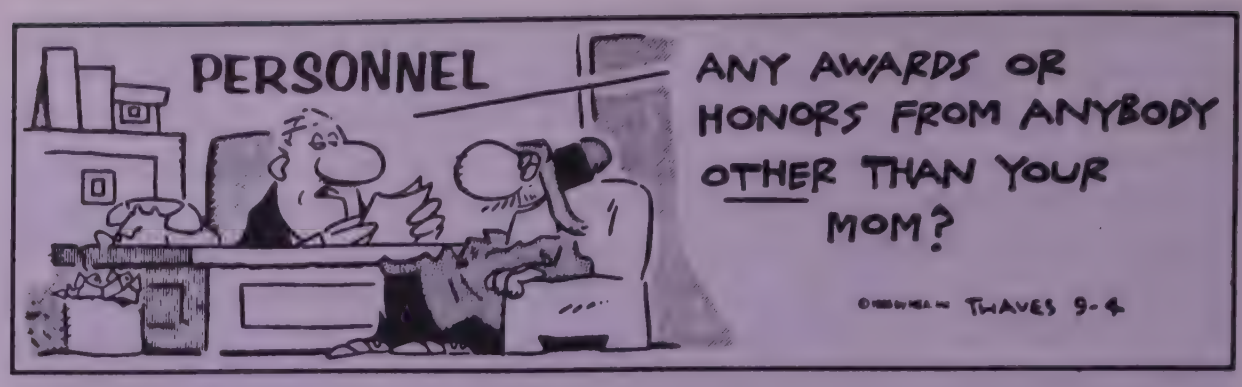
Performance Appraisals: Potential Sources of Error Suppose that at some future time, you faced the task of evaluating the performance of several people who work under your direction. How would you proceed? Perhaps, before you completed any rating forms, you would stop and think about each person, trying to remember what his or her performance had been like during the period in question—the last year or six months. What would you remember? And how would you combine this information into an overall evaluation? Further, how would you then compare the work of the different individuals in question? As you can readily see, this is a complex process; and if you remember our discussions of memory in chapter 6 and social cognition in chapter 16, you realize that there are many potential sources of error and distortion. Let's consider several of these.

Errors in attribution. Imagine, once again, that you are faced with the task of evaluating two people who work under your supervision. Thinking back over the past year, you conclude that both have shown average performance. However, you also know that one of these persons is highly talented and has a lot of experience; he has "coasted" to an average level of performance. In contrast, the other person is quite low in ability and has little experience; she has had to work very hard to reach average performance. Will you assign equal ratings to the two people? Perhaps—but it is also quite possible that you will assign higher ratings to the person who is lacking in talent but trying very hard. Why? Because in evaluating others we consider not only their performance but also the *causes* behind it. And research findings suggest that often we do assign higher ratings to persons whose performance stems from high motivation and effort than to ones whose similar performance stems mainly from talent or past experience (Mitchell, Green, & Wood, 1982). Further, additional findings indicate that we are more likely to attribute successful performance by persons we like than by persons we don't especially like to *internal* causes—their ability or effort (Heneman, Greenberger, & Anonyuo, 1989). In sum, *attributional processes* are one potential source of error in performance appraisals—a source that can lead us to evaluate persons with identical levels of performance quite differently.

Halo effects: When overall impressions shape specific judgments. You probably know the old saying "Love is blind." It refers to the fact that when individuals are in love, they often lose all ability to evaluate the object of their affection in an accurate, impartial manner. Unfortunately, those in love are

A Halo Effect in Operation

(*Source:* FRANK & ERNEST reprinted by permission of NEA, INC.)



not the only ones to fall victim to such effects. Once we form an overall reaction to another person, this general reaction often has strong effects on our judgments of her or his specific traits or performances. These **halo effects** can be either positive or negative in form. If our impression of another person is favorable, we tend to see everything he or she does in a positive light—a kind of golden halo. If our impression is unfavorable, we tend to perceive all of this person's actions in a negative manner—a rusty horns effect (Feldman, 1986; Nathan & Lord, 1983). Another way to think of halo effects is in terms of inflated correlations between various dimensions on which performance is rated. In other words, when halo effects operate, we tend to perceive stronger correlations between various aspects of a person's performance than are actually legitimate.

Clearly, to the extent that halo effects influence performance appraisals, the appraisals' accuracy may be reduced. And in fact many studies suggest that halo effects *do* reduce the accuracy of performance appraisals (e.g., Binning et al., 1988; Nathan & Tippins, 1990). However, some experts believe that halo effects are not as widespread or as large as has often been assumed (Murphy, Jako, & Anhalt, 1993). Further, they note that raters sometimes *consciously* choose to rate specific persons high (or low) on all dimensions. This often happens in cases where a manager wants to recommend a person for promotion—or for dismissal. In other words, raters consciously rate someone as high on all dimensions or low on all dimensions because they know that doing so will help them to make a strong case for the action they want to recommend (Murphy, Jako, & Anhalt, 1993, p. 222). In such cases it doesn't make much sense to talk about the unconscious influence of halo effects. Despite these points, however, it is clear that halo effects can often pose a serious threat to the accuracy of performance appraisals, and that steps to guard against their influence are often worthwhile.

Leniency errors: Inflated ratings of others. Have you ever heard the phrase "grade inflation"? It refers to the fact that in recent decades the average grade point average of students at most universities in the United States and elsewhere has risen considerably. When I was a college student in the early 1960s, getting a 3.0 was a real accomplishment; now, it's far less rare. Is this because students are getting smarter or studying harder? Probably not. Rather, it stems from the fact that professors (like me!) have increased the number of A's and B's we assign to students in our classes. The reasons for this are complex, but one element in the equation may be the fact that in recent years students have become much more willing to "discuss" their grades with faculty members, and even to protest them, both formally and informally. Wishing to avoid such unpleasant discussions, faculty members have gradually raised the proportion of high grades they assign.

Halo Effects: The tendency to evaluate all traits or aspects of performance by another person in a manner consistent with our overall impression of this person.

Similar processes often operate in work settings, where persons who must evaluate others' performance tend to inflate these ratings. This can be a seri-

ous problem: In some organizations, almost *everyone* receives high ratings on whatever type of scale is used. At my university, for example, virtually every clerical employee is rated "outstanding" on all dimensions. This makes it impossible to differentiate between employees with respect to raises, promotions, and other benefits.

Why do such **leniency effects**—tendencies to inflate performance appraisals—exist? As we have already seen, one explanation is that raters know they will have to present their evaluations to the persons they rate. Thus, they consciously raise these ratings to avoid unpleasant confrontations (Banks & Murphy, 1985; Murphy & Cleveland, 1991). Another possibility involves the operation of subtle forms of bias in the cognitive processes that underlie performance appraisals (Hauenstein, 1992). When managers know that they will have to discuss their evaluations with the persons they rate, they may have a tendency to notice and remember instances of positive performance. In other words, they focus on information that will make their task easier by allowing them to assign favorable evaluations (Hauenstein, 1992). Whatever their precise basis, leniency effects can greatly reduce the accuracy of performance ratings.

Stereotypes. We have already examined the impact of *stereotypes*, another source of error in performance appraisals, in chapter 16. Stereotypes are cognitive frameworks consisting of knowledge and beliefs about specific social groups—frameworks suggesting that, by and large, all members of these groups possess certain traits (Judd, Ryan, & Park, 1991). Like other cognitive frameworks, stereotypes exert strong effects on the ways in which we process social information. For example, we process information relevant to a particular stereotype more quickly than information unrelated to it (Dovidio, Evans, & Tyler, 1986). Similarly, stereotypes lead us to pay attention to specific types of information—usually information consistent with the stereotypes. Finally, stereotypes also determine what we remember—usually, again, information that is consistent with these frameworks.

What is the relevance of such effects to performance appraisals? When stereotypes operate, they may lead raters to assign lower ratings to members of the stereotyped groups (e.g., Gilbert & Hixon, 1991). Unfortunately, stereotypes exist for many racial, ethnic, and religious groups, and even for occupations or professions. At my engineering-oriented university, for example, I often run into a negative stereotype for *psychologists*—one suggesting that they are unscientific in orientation, largely unfamiliar with mathematics, muddled in their thinking, and probably somewhat flaky. Naturally, I object strongly to this stereotype whenever I encounter it. Other stereotypes with important implications for performance appraisals center on age—and again, these are mainly negative—and on gender. Effects of gender-based stereotypes are considered in detail in the **Perspectives on Diversity** section on pages 690–691.

In sum, many different factors can contribute to errors in evaluating others' performance and recent findings indicate that all too often they do exert such effects: They strongly influence both the processes that play a role in performance appraisal and the ratings it actually yields (Robbins & DeNisi, 1994). As I've tried to point out, many of these errors involve basic aspects of social thought, and, in fact, research on performance appraisals has often drawn heavily on basic scientific knowledge of social cognition. In other words, efforts to improve the accuracy and fairness of performance appraisals clearly are a prime illustration of the close and valuable links, in psychology, between basic research and its application to important practical issues.

Leniency Effects: *Tendencies to assign higher ratings to persons being evaluated than they actually deserve.*

Negative Effects of Gender Stereotypes: Why Males Often Get the Job

Females have often been—and remain—the object of strong, persistent stereotypes. To an extent, so have males: They, too, are perceived as being "all alike" in certain respects. By and large, however, stereotypes about females are more negative in content than those about males. In many cultures males are assumed to possess such desirable traits as *decisiveness, forcefulness, confidence, ambition,* and *rationality*. In contrast, females are assumed to possess less-desirable traits such as *passivity, submissiveness, indecisiveness, emotionality,* and *dependence*. True, stereotypes for females contain positive traits as well: *kindness, sensitivity,* and *nurturance*. On the whole, however, the traits assigned to females appear to be less desirable than those assigned to males.

This is especially true with respect to valued roles in work settings (Heilman, Martell, & Simon, 1988). Consider the traits most people view as necessary for success in high-level jobs—ones involving leadership and authority. Such traits include *boldness, toughness, decisiveness,* and even *aggressiveness*. Clearly, the gender stereotype for males is closer to this list. The result: females are often perceived as less suited to such roles than males, despite the fact that, as we saw in chapter 11, they perform them just as well (Heilman, Martell, & Simon, 1988). Thus, they are evaluated less favorably as candidates for high-level positions and often experience slower promotions and lower salaries (Stroh, Brett, & Reilly, 1992).

Clear evidence for the operation of gender stereotypes and for their negative impact on females, is provided by a study conducted by Van Vianen and Willemsen (1992). These researchers studied the effects of gender stereotypes on the decisions of employment board members in the Netherlands. Members of these boards (some of whom were female and some male) had the responsibility of interviewing applicants for high-level scientific and technical jobs at a university.

Board members completed two questionnaires. On one they rated the attributes of *ideal candidates* for these jobs, while on the other they rated the perceived qualities of each actual job applicant. Ratings on both questionnaires involved traits previously found to be part of masculine and feminine gender stereotypes. For example, positive traits that were part of the masculine gender stereotype included *daring, forceful, logical, confident*; negative traits included *arrogant, dominating,* and *reckless*. Positive traits in the feminine gender stereotype were *understanding, sociable, spontaneous, warm,* and *gentle*; negative traits included *dependent, dreamy, changeable,* and *affected*.

Results provided strong support for the view that gender stereotypes were influencing both conceptions of the ideal job candidate and the actual selection of applicants. First, descriptions of the ideal candidate provided by the board members included mainly traits present in the masculine gender stereotype. This suggests that in the eyes of these persons, the traits required for success in high-level jobs were primarily ones usually attributed to males. Second, the candidates they recommended for the jobs were rated as possessing masculine attributes to a greater extent than candidates they rejected. Third, as shown in Figure 17.5, accepted and rejected female candidates differed significantly in terms of the extent to which they were perceived as possessing traits associated with the masculine stereotype. Females who were hired were much closer to the description of the ideal candidate—and hence closer to the masculine stereotype—than females who were rejected.

Fortunately, it appears that the impact of gender stereotypes can be reduced when clear evidence of a woman's ability or competence is provided to raters or interviewers (Heilman, Martell, & Simon, 1988). Nevertheless, the findings

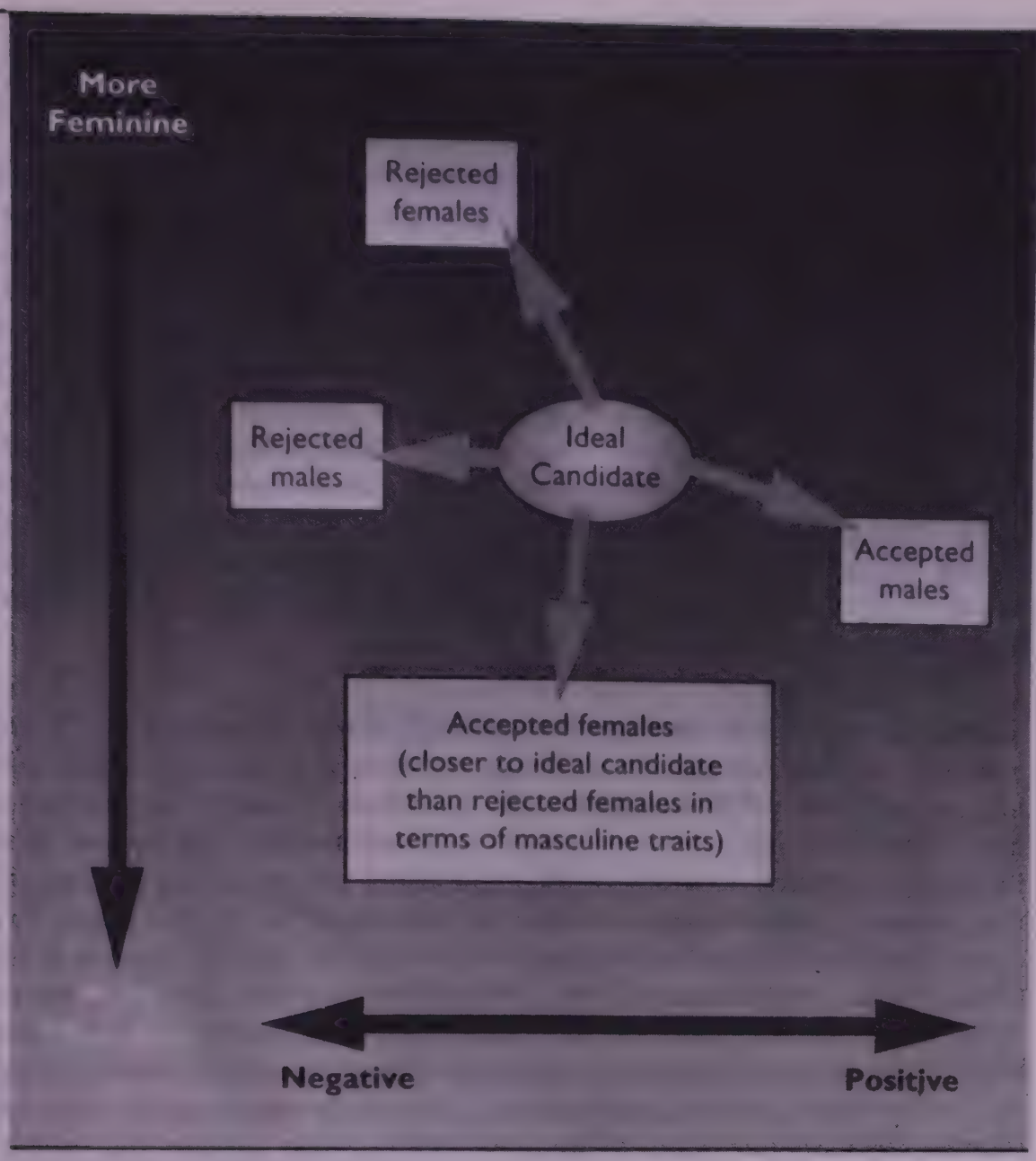


FIGURE 17.5

One Way in Which Gender Stereotypes Affect Employment Opportunities

Female applicants who were selected for a job were perceived as possessing more traits typically associated with males compared to female applicants who were rejected.
(*Source:* Based on data from Van Vianen & Willemsen, 1992.)

obtained by Van Vianen and Willemsen (1992) and other researchers suggest that in many instances persistent gender stereotypes can and do exert negative effects on the career prospects of working females.

PERFORMANCE APPRAISALS: TECHNIQUES FOR REDUCING ERRORS As we have seen, performance appraisals are subject to a wide range of errors and biases. Given these difficulties, is it possible to enhance the accuracy of such ratings? I/O psychologists have focused a great deal of attention on this important question. The basic conclusion of their research is optimistic: Yes, the accuracy of performance appraisals *can* be increased. However, doing so requires considerable preparation and effort. In other words, there is no simple "quick fix" for this issue. Instead, several different steps can, together, increase the extent to which the ratings assigned to specific persons reflect their contributions. I'll describe several of these here.

The importance of keeping accurate records. Memory, as explained in chapter 6, is very uncertain. Sometimes we forget information we wish to remember; sometimes we falsely "remember" events that never occurred; and there is ample opportunity for distortion and change in information

entered into memory. This suggests the importance, for persons who must evaluate others' performance, of keeping accurate records. Often termed *diary notes*, these should ideally be entered into employees' records soon after any event occurs. What should be entered? Any information relating to performance that is either better or worse than average (Balzer & Sulsky, 1990). Then such records should be consulted when annual or semiannual ratings are made. Complete and accurate diary notes are valuable in three respects. First, they help overcome the fallibility of human memory—for example, the probability that important information relating to performance will be overlooked. Second, they provide a basis for explaining to individuals *why* they received the ratings they did. When raters can point to specific instances of good or poor performance, the basis for their ratings becomes more apparent to the persons they have evaluated. Finally, diary notes provide a written record that can be introduced into legal proceedings if employees file complaints about their treatment. For all these reasons, the basic rule raters should follow with respect to employee performance is this: *Write it down as soon after it happens as possible.*

Rating formats: How ratings are actually done. Have you ever received a formal performance appraisal? If so, you know that such appraisals usually involve more than verbal comments by your boss. Usually, they involve written forms on which raters enter their evaluations. Can the nature of these forms influence the accuracy of the evaluations provided? Early research on this question yielded mixed results, and led some I/O psychologists to conclude that *raters* rather than rating forms were the primary source of errors (DeNisi et al., 1984; Landy & Farr, 1983). While it is certainly true that many errors in performance appraisals do stem from raters and from their susceptibility to the limitations and errors described earlier, recent research suggests that some kinds of rating scales may indeed be more useful than others (Hartel, 1993; Steiner, Rain, & Smalley, 1993). It also appears that raters can be *trained* in certain ways that help to reduce errors (Sulsky & Day, 1992). Here, we'll focus on two major rating scale formats that have received much research attention in I/O psychology.

The first of these formats, known as **behaviorally anchored rating scales**, or BARS (Landy & Farr, 1983), is based on the view that in order to rate someone effectively along a given dimension, raters must have a clear idea of what actions constitute excellent, good, average, poor, or unacceptable performance. If they do not, then each rater may use these categories differently. In other words, each may have a different idea of what constitutes "excellent" or "poor" performance. To the extent this is so, different raters may assign sharply contrasting ratings to persons who, objectively, perform at the same level.

Behaviorally anchored rating scales, or BARS, it is believed, can help prevent such problems. In order to construct such a scale, a group of persons familiar with the job first comes up with from ten to twenty dimensions of performance relating to that job. For example, with respect to the job of *university professor*, such dimensions might include teaching, research, counseling of students, service to the university, and service to the community. Next, a second group of persons formulates examples of excellent, good, average, poor, and unacceptable performance for each dimension. An example of excellent performance with respect to teaching might be: *90 percent or better class attendance by students*. Poor performance might be: *70 percent of the class falls asleep during most lectures*. For research, an example of excellent performance might be: *Publishes two or more articles in major journals each year*. An example of unac-

Behaviorally Anchored Rating Scales: *Performance appraisal scales that provide raters with behavioral examples of various levels of performance (excellent, good, average, and so on).*

Dimension of Job Performance	Examples of Behavior
Teaching	*Excellent:* Students in the professor's classes score higher than average on departmentwide final examination. *Average:* Students in the professor's classes score average on departmentwide final examination. *Poor:* Students in the professor's classes score lower than average on departmentwide final examination.
Counseling students	*Excellent:* All students counseled by this professor request that the professor continue as their counselor. *Average:* Most students counseled by this professor request that the professor continue as their counselor. *Poor:* All students counseled by this professor request a different counselor.
Service to department	*Excellent:* Serves on two or more important committees; comes to all meetings; contributes actively. *Average:* Serves on one committee; comes to most meetings; contributes. *Poor:* Serves on one committee. Rarely comes to meetings; never participates.

Table 17.1

Behaviorally Anchored Rating Scales

On a behaviorally anchored rating scale (BARS), raters receive examples of various levels of performance for each job dimension on which they evaluate others. These examples help ensure that all raters have a clear idea of precisely what kind of actions constitute excellent, good, average, and poor performance.

ceptable behavior might be: *Has never published an article and has no plans to publish one.* The same procedure is used for each dimension, and then the examples formulated are given to still another group of persons familiar with the job for validation—to find out if they agree that these examples actually relate to each dimension (teaching, research, and so on) and really illustrate each level of performance (excellent, good, and so on). The result is a BARS—a rating scale that focuses on dimensions that are actually related to the job in question and that provides raters with examples on which to base their own ratings. An example of a BARS is presented in Table 17.1.

Although it's not entirely clear that the BARS format improves accuracy for all raters (Hartel, 1993), this format does appear to constitute a major advance over informal rating scales in which the dimensions along which people are rated may or may not be related to their jobs, and in which raters are on their own with respect to determining what constitutes each level of performance.

A second type of rating format that has received growing attention is **distributional ratings of performance** (Jako & Murphy, 1990). This approach is based on the fact that everyone's performance varies over time, being better at some times than at others. To take account of this fact, distributional rating scales ask raters to indicate what percent of the time each ratee's performance

Distributional Ratings of Performance: *Performance appraisal scales that ask raters to indicate what proportion of the time the performance of the persons being evaluated falls into various categories—excellent, good, and so on.*

KEY POINTS

- Performance appraisals are assessments of employees' performance, coupled with feedback about these ratings. They are subject to many potential forms of bias, such as attributional errors, halo effects, leniency effects, and stereotypes.
- Although many errors in performance appraisal stem from the cognitive limitations of raters, others may involve the nature of the rating forms used.
- Two techniques for reducing such errors are behaviorally anchored rating scales (BARS) and distributional ratings of performance.

is excellent, good, average, poor, and so on. The ratings obtained in this manner not only provide an average or overall evaluation of performance, they also provide some estimate of the person's *variability* in performance. This is an important consideration, because for many jobs low variability in performance is very important. For example, most people would object strongly to a dentist whose performance varied widely, so that on some visits she filled cavities perfectly and painlessly, while on others she filled the wrong teeth and caused horrible agony! To date there has been relatively little research on distributional rating scales, but existing evidence suggests that they may be quite effective (Steiner, Rain, & Smalley, 1993).

To conclude: performance appraisal is indeed a complex process subject to many potential errors. However, by recognizing sources of possible bias and taking steps to reduce them, we can increase the accuracy and thus the fairness of the process. Clearly, this represents a major contribution by I/O psychologists to the welfare of all working persons.

WORK-RELATED ATTITUDES: The Prevalence, Causes, and Effects of Job Satisfaction

In chapter 16 I defined *attitudes* as evaluations of various aspects of the social or physical world (Judd et al., 1991). Since work plays such an important role in most adults' lives, it is only natural to expect that people will hold many work-related attitudes—for example, attitudes toward their jobs (Gutek & Winter, 1992), their company (Meyer, Allen, & Smith, 1993), their coworkers and subordinates, and their boss. This is certainly the case, and such *work-related attitudes* have long been a topic of study in I/O psychology: Here, we'll focus on what many experts consider to be the most important of these work-related attitudes: **job satisfaction**, the attitudes people hold toward their jobs.

THE PREVALENCE OF JOB SATISFACTION: DO PEOPLE LIKE THEIR WORK?

Remember my first full-time job? I truly hated it; I couldn't wait for it to end, and I stayed in it only because I needed the money for college. Is this a common experience? Or do most people hold more positive attitudes about their jobs? The results of large-scale surveys conducted in several countries and over many years point to a fairly encouraging conclusion: Most people report being quite satisfied with their work situation (Page & Wiseman, 1993). In fact, 80 to 90 percent of respondents to these surveys report high levels of job satisfaction.

The total picture is a bit more complex than this, however. First, people are not equally satisfied with all aspects of their jobs. Thus, while they may report a high level of satisfaction overall, closer examination of their attitudes indicates that they are more satisfied with some aspects than others. For example, they may be satisfied with their pay but be less happy about their working conditions or their relations with coworkers. Second, some groups of people report higher levels of job satisfaction than others. Who tends to be the most satisfied? Here are some key findings:

Job Satisfaction: *Individuals' positive or negative attitudes toward their jobs.*

- White-collar personnel (managers, technical and professional employees) tend to be more satisfied than blue-collar employees.

- Older people with more job seniority tend to be more satisfied than younger, less experienced people (Eichar, Brady, & Fortinsky, 1991).
- Women and members of minority groups tend to be less satisfied with their jobs than men and members of majority groups (Lambert, 1991).

In addition, it appears that there are some individuals who tend to be relatively satisfied with their jobs, whatever these are, while others tend to be dissatisfied no matter what job they hold (Staw & Ross, 1985). Apparently job satisfaction is a relatively stable tendency or disposition—one people carry with them from one job to another (Gutek & Winter, 1992; Staw & Ross, 1985). So individual differences, too, seem to play a role in expressed levels of job satisfaction for many persons. In fact, recent findings indicate—surprisingly—that even *genetic factors* may play a role in job satisfaction.

For instance, consider a study conducted by Arvey and his colleagues (1989). These researchers assessed current job satisfaction reported by thirty-four pairs of identical twins who had been separated at an early age and then raised apart. Because such pairs have identical genetic makeup but have undergone different life experiences, any correlation between the twins' current levels of job satisfaction provides evidence suggesting that genetic factors play a role in such attitudes. In fact, the twins were quite similar in terms of job satisfaction. Indeed, results indicated that about 30 percent of the variation in expressed job satisfaction could be attributed to genetic factors.

These findings have been questioned by other researchers who note, for example, that despite being raised apart, the twins in the study by Arvey and his colleagues actually grew up in similar homes; thus, any overlap in their reported job satisfaction could stem from such factors (Cropanzano & James, 1990.) Further, not all studies designed to examine the possible effects of genetic factors on job satisfaction have yielded positive results (e.g., Hershberger, Lichtenstein, & Knox, 1994). However, the fact that such findings have been reported by several teams of researchers (e.g., Keller et al., 1992) supports the conclusion that genetic factors play some role in work-related attitudes.

In sum, it appears that while job satisfaction is affected by many external factors, such as the ones we'll now consider, attitudes about work also reflect stable differences among individuals—differences that may be influenced to some extent by genetic factors.

The Causes of Job Satisfaction Are there specific aspects of jobs or organizations that influence job satisfaction? Informal experience suggests that there certainly are: Why else would people in some work settings express very positive views about their jobs and choose to remain in them for decades, while those in other settings express dissatisfaction and leave for other jobs as soon as possible? In fact, research on the causes of job satisfaction has identified many factors that influence these attitudes. These are very varied in nature, but generally fall into two major groups: factors relating to *jobs* and the context in which they are performed on the one hand, and factors relating to *personal characteristics* of employees on the other.

Work-related influences on job satisfaction. One key determinant of job satisfaction has to do with a topic we have already considered—the *reward system* in place in an organization. Job satisfaction tends to be higher when individuals believe that this system is fair and operates impartially than when they believe it is unfair and shows favoritism (Miceli & Lane, 1991). Another factor that has a major impact on job satisfaction is the *perceived qual-*

PERSON-JOB FIT: AN IMPORTANT DETERMINANT OF JOB SATISFACTION

Research findings indicate that the closer the match between people's jobs and their interests—one aspect of *person-job fit*—the greater their job satisfaction.
(*Source:* HAGAR THE HORRIBLE by Dik Browne © 1990 by King Features Syndicate, Inc. World rights reserved. Reprinted with special permission of King Features Syndicate.)

ity of supervision—the extent to which employees believe that their bosses are competent, have their best interests at heart, and treat them with respect and consideration. Related to this, the more opportunity individuals have to communicate with their supervisors, the higher their job satisfaction tends to be (Callan, 1993). A third important factor is the extent to which individuals feel that they can participate in decisions that affect them (Locke & Schweiger, 1979). Fourth, the level of *work and social stimulation* provided by jobs themselves is important. Many people report highest levels of satisfaction with jobs that provide them with a workload and level of variety that are neither so low as to be boring nor so high as to be overwhelming (Wright, 1990). Finally, individuals tend to report higher levels of satisfaction when their jobs are performed in *pleasant work settings* than in unpleasant ones. What makes a work setting pleasant? Many aspects of the physical environment, including comfortable temperature, adequate lighting, absence of noise, fresh as opposed to stale air, and adequate space and privacy (Sundstrom & Sundstrom, 1986). We'll return to this issue in our later discussion of human factors and effects of the physical environment on work behavior.

Person-related influences on job satisfaction. We have already considered several personal factors related to job satisfaction; for example, the fact that persons with seniority and relatively high status report higher levels of job satisfaction than others. Several aspects of personality, too, appear to be linked to job satisfaction. For example, persons high in self-esteem and those who are Type A's (see chapter 13) tend to report higher job satisfaction than persons low in self-esteem and those who are Type B's. Another important factor is the extent to which people are performing jobs consistent with their own interests. The closer this *person-job fit*, the higher is job satisfaction (Fricko & Beehr, 1992).

One framework for measuring this kind of fit—and for helping people choose jobs that are consistent with their interests—has been developed by Holland (1973). This approach, sometimes known as the *Holland Scales*, categorizes people in terms of the type of activities they most enjoy—for example, interacting with others (social) or solving problems (investigative)—and also categorizes occupational environments on these same dimensions. Holland contends that people are most productive and happiest when there is a good fit between their interests and the requirements of their jobs, and this idea has been confirmed by research findings (e.g., Feldman & Arnold, 1985). The six personality types in Holland's theory are shown in Table 17.2.

In sum, a wide range of factors influence job satisfaction. Thus, there are many concrete steps that organizations can take to enhance such attitudes on the part of their employees.

JOB SATISFACTION: ITS MAJOR EFFECTS Attitudes often are reflected in overt actions; thus, we might expect job satisfaction to influence work-related

Personality Types	Matching Occupational Environment
Realistic: Use of tools and machines; physical activity requiring skill, strength, coordination.	Forestry, farming, architecture, police work, carpentry
Investigative: Observing, organizing, engineering, understanding data.	Biology, mathematics, geology, dentistry
Social: Interpersonal activities; enjoys informing, training, and instructing others.	Clinical psychology, education, foreign service, social work
Conventional: Structured, rule-regulated; enjoys ordered, systematic activities.	Accounting, finance, bookkeeping, clerical work, military
Enterprising: Verbal activities to influence others, to attain power and status. Activity rather than observation.	Management, law, labor relations, sales
Artistic: Self-expression, artistic creation, expression of emotions, individual activities. Dislikes repetitive, ordered activities.	Art, music, drama, advertising, interior design

Table 17.2

Person-Job Fit: The Holland Model

According to a model proposed by Holland, people are most productive and happiest when their interests match the requirements of their jobs. This table shows careers that offer good person-job fit for individuals with six contrasting patterns of interests.
(*Source:* Based on Holland, 1973.)

behavior. In fact, it does, but the relationship is more complex, and perhaps more subtle, than you might expect. Let's consider the impact of job satisfaction on two important aspects of work-related behavior: employee withdrawal (absenteeism, quitting) and task performance.

Job satisfaction and employee withdrawal. When people are dissatisfied with their jobs, they find ways to minimize contact with them—they *withdraw*. Two major forms of employee withdrawal are *absenteeism*—not showing up for work; and *voluntary withdrawal*—quitting. With respect to absenteeism, it has been found that the lower individuals' job satisfaction, the more likely they are to be absent from work (Porter & Steers, 1973). The strength of this relationship, however, is quite moderate. Why? Probably because low job satisfaction is just one factor influencing employees' decisions to come to work. For example, even persons who dislike their jobs will come to work every day if they are not paid when they are absent and if they need the money. Similarly, people with relatively high job satisfaction may miss work for other reasons: Their car breaks down, their child is ill, their carpool fails to arrive, and so on. For these and other reasons, it is not surprising that the relationship between job satisfaction and absenteeism is not very strong.

Voluntary turnover, too, is related to job satisfaction, but once again, only modestly (Tett & Meyer, 1993). Economic factors play a role: People are reluctant to quit one job when the prospects of another one are dim. Thus, the relationship between job satisfaction and turnover tends to be weaker when the job market is tight than when there are many good jobs unfilled (Carsten & Spector, 1987). In addition, personal factors also enter the picture. For example, people's *affective dispositions*—their tendency to be generally satisfied and happy or generally dissatisfied—seem to have a bearing on voluntary turnover. Which group do you think would be more likely to quit their jobs when dissatisfied? If you guessed "the ones who are generally dissatisfied—those who gripe all the time," think again. Perhaps people who are generally

Key Points

- Job satisfaction, the extent to which people like or dislike their jobs, is an important work-related attitude. It is influenced by many different variables; even genetic factors seem to play a role.
- Job satisfaction is modestly related to absenteeism and voluntary withdrawal. It is weakly related to individual performance but may be more strongly linked to organizational performance.

dissatisfied with life realize that changing jobs won't help: They'll *still* be unhappy. In contrast, people who are generally happy may believe (perhaps with good reason) that changing jobs *will* help; after all, they're quite satisfied with other aspects of their lives. In any case, in a recent study Judge (1993) found that among a group of nurses and medical technicians who reported low job satisfaction, those with a positive disposition were actually more likely to quit than those with a negative disposition.

In short, job satisfaction does predict voluntary withdrawal by employees, but this relationship is a fairly modest one because so many other factors also enter into the decision to quit. For information on the effect of job satisfaction on task performance, please see the **Research Process** section below.

The Research Process

Job Satisfaction and Task Performance

Many people believe that "happy employees are productive employees"—that persons who have positive attitudes toward their jobs will work harder than persons who hold negative attitudes. Surprisingly, however, studies designed to examine this relationship have often reported disappointing results. Job satisfaction *is* related to various measures of performance or productivity; but, once more, the strength of this relationship is weak. In fact, one survey of existing evidence that used meta-analysis (refer to the discussion of this topic in chapter 1) reported that the correlation between job satisfaction and performance was only 0.15.

Why isn't this relationship stronger? The explanation may lie in several factors. First, in many work settings, there is little room for variations in performance. Many jobs are structured so that the people holding them *must* maintain at least some minimum level of performance just to hold their jobs. Nor can they exceed this minimum by much, because their work depends on what others do. Because of this limited range of possible performance, job satisfaction cannot exert a strong influence.

Second, as was true for turnover, many factors other than job satisfaction influence performance. For example, even employees who are highly satisfied with their jobs can't perform at high levels if they lack needed supplies, or if their equipment breaks down frequently. Third, job satisfaction and performance may not be directly linked. Rather, any apparent relationship between them may stem from the fact that both are related to a third factor—receipt of various rewards. As suggested by Porter and Lawler (1968), both job satisfaction and high levels of performance may stem from the receipt of rewards. When these are high and are perceived as fair, both performance and job satisfaction may increase, but there may be no direct link between these two factors.

Job Satisfaction and Performance: Individuals or Organizations?

Having pointed out why job satisfaction and performance may not be closely linked, I should now add that one recent and impressive study *has* found a stronger relationship between them (Ostroff, 1992). The researcher who performed this study pointed out that previous investigations of the link between job satisfaction and performance have focused on *individual* performance. In contrast, it might be more appropriate to consider the effects of job satisfaction on an *organization's* performance—how profitable or successful it is. To test this hypothesis, Ostroff studied job satisfaction among principals, teachers, and students in hundreds of schools throughout the United States and Canada. Then she related these attitudes to measures of the schools' performance: academic achievement by students (scores on standard achievement tests); student behavior (dropout rates, average daily attendance rates); teacher turnover; performance of the schools' administrators; and so on. As you can see from Figure 17.6, correlations between satisfaction and these measures of organizational performance averaged 0.28—versus only about 0.15 for correlations between satisfaction and individual performance. So it appears that the relationship between job satisfaction and organizational performance is somewhat

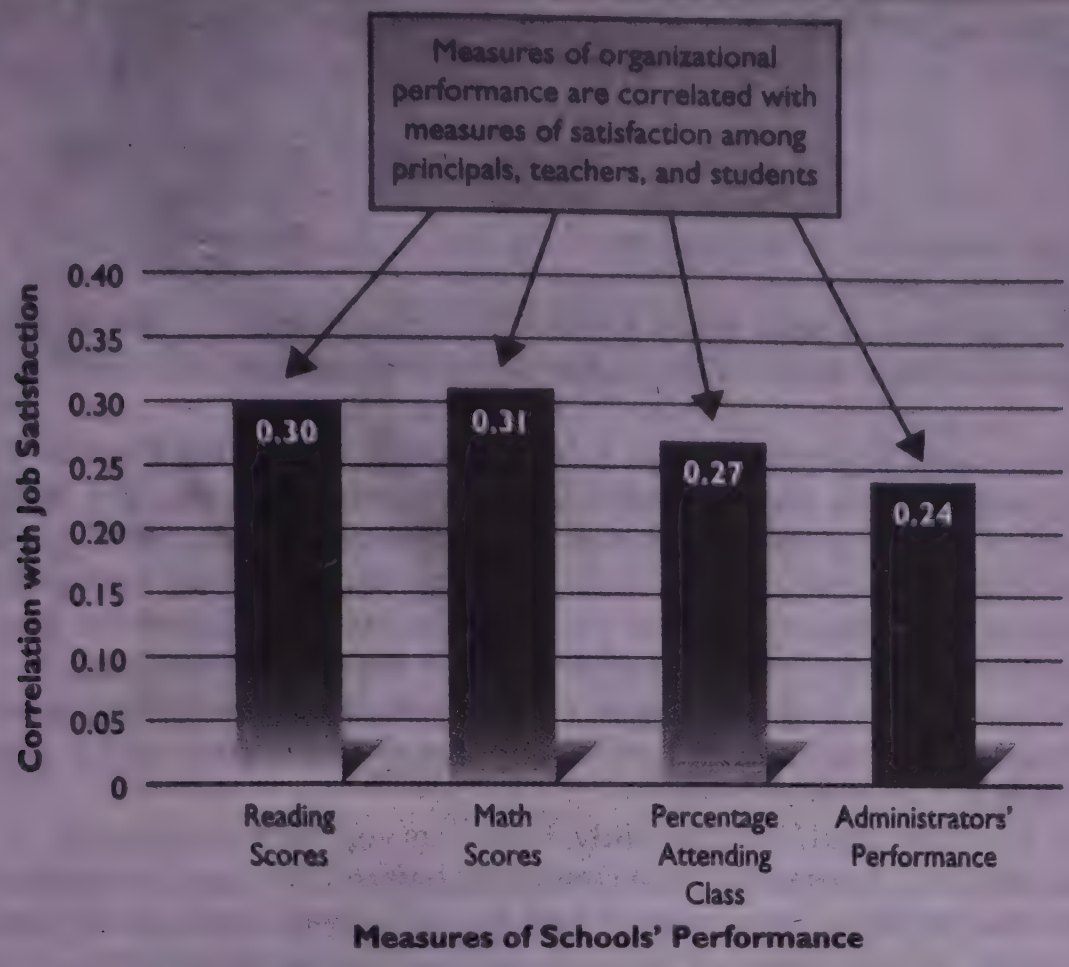


FIGURE 17.6

Job Satisfaction and Organizational Performance

Job satisfaction among principals, teachers, and students was correlated with various measures of their schools' performance. These findings indicate that the link between job satisfaction and *organizational* performance may be somewhat stronger than the link between job satisfaction and *individual* performance.
(*Source:* Based on data from Ostroff, 1992.)

stronger than that between job satisfaction and individual performance.

Why? Ostroff (1992, p. 969) suggests that individual measures of performance may not fully reflect the interactions and dependencies among many people that affect an organization's overall performance. For example, persons whose job satisfaction is high may be more likely than those whose satisfaction is low to engage in such actions as helping their co-workers, cooperating with them, making constructive suggestions, or investing effort in public relations—behaviors that do not necessarily improve their individual performance, but which contribute to the success of the entire organization. Such actions are sometimes described as **organizational citizenship behavior** (or *organizational spontaneity*), and they have been found to influence an organization's performance (George & Brief, 1992; Organ, 1988). In sum, as I stated earlier, job satisfaction and performance *are* linked, but this relationship is more complex than common sense might suggest.

CRITICAL THINKING QUESTIONS

1. Can you think of additional reasons, besides those mentioned above, why job satisfaction might not be closely linked to performance in some situations?
2. Are there any factors other than high rewards that might produce high levels of both job satisfaction and performance, thus creating the appearance that these two variables are directly linked?
3. Ultimately, the performance of an organization depends on the performance of the persons in it. So, in a sense, Ostroff's (1992) findings indicate that job satisfaction does affect individual performance as well as an organization's performance. Do you agree? If so, why; if not, why not?
4. In many organizations, if people help others, their own work may suffer. Also, they may be competing with others for promotions, bonuses, and so on. Could high levels of job satisfaction encourage mutual helping even under these conditions?

Organizational Citizenship Behavior: *Actions performed by individuals that are not part of their regular jobs but contribute to the success of the organization.*

LEADERSHIP: Its Nature and Impact

Suppose you conducted a survey in which you asked many different people the following question: "What is the key difference between highly successful organizations and mediocre ones?" The chances are good that many people

would reply: "Good leadership!" There is a widespread belief that leadership is a key ingredient for success in many areas of life—business, sports, the military, and politics, to name just a few. But what, precisely is leadership? Like love, it is something we can readily recognize but can't easily define. Psychologists who have studied leadership, however, generally define it as follows: **Leadership** is the process through which one member of a group (its leader) influences other group members toward the attainment of shared group goals (Yukl, 1989).

In this section we'll focus on two important aspects of leadership: who becomes a leader and why, and what factors make leaders effective.

Are Leaders Born or Made? A New Look at the Great Person Theory

Are some people born to lead? Common sense suggests that this is so. Eminent leaders of the past such as Queen Elizabeth I, Abraham Lincoln, and Alexander the Great do seem to differ from ordinary human beings in many respects. Such observations led early researchers to formulate the **great person theory of leadership**. According to this approach, great leaders possess key traits that set them apart from other human beings; moreover, these traits remain stable over time and across cultures so that a great leader would be great at any time, anywhere.

Is this view valid? Until recently, there was very little evidence for its accuracy. Decades of research, most conducted before 1950, failed to yield a short, agreed-upon list of key traits shared by all leaders (Yukl, 1981). Recently, however, the pendulum of scientific opinion has begun to swing the other way, primarily in response to a growing body of findings indicating that leaders actually do differ from other persons in several important—and measurable—respects. For example, after reviewing a large number of studies concerned with this issue, Kirkpatrick and Locke (1991) concluded that in business settings—the primary focus of I/O psychology—traits do matter; certain traits, together with other factors, do contribute to a leader's success. These traits are summarized in Table 17.3.

Most of the leadership traits listed in Table 17.3 are ones you can readily recognize: honesty, drive, self-confidence. One trait, however, seems to be especially important, so it is worthy of additional comment. This characteristic is *flexibility*—the capacity of leaders to recognize what actions or style of leadership are required in a given situation and then to adopt them. Growing evidence indicates that this trait plays a key role in successful leadership in many situations (Mumford et al., 1993; Zaccaro, Foti, & Kenny, 1991). Persons who demonstrate high levels of such flexibility quickly rise to positions of leadership in many different contexts, and they are readily recognized as leaders by others. Apparently, this recognition is due primarily to the fact that such persons can give the groups they lead just what the groups need: firm direction if this is required; a democratic, hands-off approach if that's most appropriate; and so on. So, while many personal characteristics seem to play a role in determining who becomes a leader, one of the most important of these seems to be flexibility—an ability to match one's behavior and style to the needs of a given situation.

Leadership: *The process through which one member of a group (its leader) exerts influence over other group members with respect to the attainment of shared group goals.*

Great Person Theory of Leadership: *A theory suggesting that all great leaders share certain traits.*

By the way, with respect to *leadership style*, I should mention a very large body of evidence indicating that two dimensions are key: the extent to which leaders adopt a *democratic* versus an *autocratic* approach to running their groups, and the extent to which they focus on personal relationships (sometimes referred to as *showing consideration*) or on task performance (sometimes known as *initiating structure*). As I noted in chapter 11, these appear to be two basic dimensions along which leader behavior can vary. Not surprisingly, no

Trait	Description
Drive	Desire for achievement; ambition; high energy; tenacity; initiative
Honesty and integrity	Trustworthiness; reliability; openness
Leadership motivation	Desire to exercise influence over others to reach shared goals
Self-confidence	Trust in own abilities
Cognitive ability	Intelligence; ability to integrate and interpret large amounts of information
Expertise	Knowledge of the group's activities; knowledge of relevant technical matters
Creativity	Originality
Flexibility	Ability to adapt to needs of followers and to changing requirements of the situation

Table 17.3

Traits Associated with Leadership

Research findings indicate that successful leaders show the traits listed here.
(*Source:* Based on suggestions by Kirkpatrick & Locke, 1991.)

single style is always best. Rather, different styles of leadership are more or less effective depending on the specific conditions that leaders and their groups face (Blake & Mouton, 1985; Yukl, 1989).

Theories of Leader Effectiveness Having introduced the concept of leader flexibility, I should add that the importance of this trait is echoed in several major theories concerned with the issue of *leader effectiveness*—leaders' success in directing their groups. For example, the importance of such flexibility is central to **normative theory**, a theory focused on how leaders should make decisions (Vroom & Yetton, 1973). According to normative theory, leaders can adopt different approaches to making decisions, ranging from an *autocratic* style, in which they simply make the decisions without consulting their followers, through a *group decision* style, in which the leader and followers reach the decision through group discussion and consensus. An intermediate approach is *consultative*; here the leader consults with followers and gets their input, but then makes the decision independently. Which approach is best? According to normative theory, this depends on the situation. For example, if acceptance of a decision by followers is crucial for its implementation, or if a leader lacks sufficient information to make a solo decision, then purely autocratic approaches are ruled out. So once again it is important that leaders be *flexible*—that they match their decision-making style to the requirements of the situation (Crouch & Yetton, 1987; Field & House, 1990).

The importance of leader flexibility is also emphasized in **situational leadership theory** (Hersey & Blanchard, 1982). According to this theory, relationships between leaders and their followers or subordinates change over time, just as all relationships do. As subordinates gain in skill and experience, they need less and less direction from the leader. In fact, they may ultimately come to resent firm direction as unnecessary meddling. Thus, to maximize their effectiveness, leaders should adjust their style over time, from one that is task-oriented and directive to one that is more relations-oriented and less directive.

As you can see, the theme of flexibility on the part of leaders is emphasized in several theories of leader effectiveness. It appears, then, that this may be a key ingredient for successful leadership in many different contexts.

Normative Theory: *A theory suggesting that to maximize their effectiveness, leaders must adopt a decision-making approach or style consistent with the situation they face.*

Situational Leadership Theory: *A theory of leadership indicating that as their followers gain increasing experience, leaders should shift from a directive to a nondirective style of leadership.*

TRANSFORMATIONAL LEADERSHIP: VISION AND CHARISMA Down through the ages, some leaders have been able to exert profound effects on their followers. For example, through his "fireside chats" and other efforts to reach the public, Franklin D. Roosevelt pulled the United States back from the brink of social chaos during the economic depression of the 1930s. Similarly, through his stirring rhetoric and forceful personality, Martin Luther King, Jr. aroused African Americans—and his entire society—to concerted action against racial prejudice. It would be easy to continue, because history is filled with such leaders: persons who inspired ordinary people to do extraordinary acts of courage—or, in some cases, to do extraordinarily *evil* things, such as the horrible atrocities committed by the Nazis under the leadership of Adolf Hitler. Leaders who exert such profound effects are described as being **transformational leaders**, or **charismatic leaders**, and these terms seem fitting, for such persons do indeed transform social, political, or economic reality. Moreover, they do seem to possess unusual skills that equip them for accomplishing these tasks. (The word *charisma* comes from the Greek for "gift.") What are these leaders like? How do they exert their profound effects on others? Systematic research has begun to yield some intriguing insights into these questions.

The basic nature of charisma. Do transformational or charismatic leaders possess special traits that contribute to their profound impact on followers? In other words, can such leadership be understood as an extension of the *great person theory* we considered earlier? Some evidence indicates that this may be so. For example, charismatic leaders do seem to possess unusually effective social skills, an outstanding ability to "read" other persons (primarily through nonverbal cues), high levels of achievement and power motivation, and exceptional levels of energy and vigor (House, Spangler, & Woycke, 1991). However, growing evidence indicates that charismatic leadership rests more on specific types of reactions by followers than on traits possessed by leaders. Such reactions include: (1) levels of performance beyond those that would normally be expected, (2) high levels of devotion and loyalty toward the leader, (3) enthusiasm for the leader and the leader's ideas, and (4) a willingness on the part of subordinates to sacrifice their own interests for the sake of a larger collective goal. In short, transformational or charismatic leadership involves a special kind of leader-follower relationship. Many experts on leadership believe that it is this relationship, rather than the specific traits possessed by transformational leaders, that accounts for their tremendous impact (House, 1977).

The behavior of transformational leaders: The importance of a vision. What do transformational or charismatic leaders do to generate this kind of relationship with subordinates? First and foremost, they possess a *vision*—an emotion-provoking image of what their nation, group, or organization could and should become (Howell & Frost, 1989). A dramatic example of such a vision, and its moving presentation, is provided by the words of Martin Luther King's famous "I have a dream" speech:

> So I say to you, my friends, that even though we must face the difficulties of today and tomorrow, I still have a dream. It is a dream deeply rooted in the American dream that one day this nation will rise up and live out the true meaning of its creed—we hold these truths to be self-evident, that all men are created equal. This will be the day when all of God's children will be able to sing with new meaning, "My country 'tis of thee, sweet land of liberty. . . ."

Transformational Leaders: *Leaders who exert profound effects on their followers and establish special types of relationships with them.*

Charismatic Leaders: *Leaders who exert profound effects on their followers and establish special types of relationships with them.*

TRANSFORMATIONAL LEADERS: MARTIN LUTHER KING, JR. AND MARGARET THATCHER

Both of the individuals shown here were transformational leaders—they exerted profound effects on their societies. Can you think of additional examples of transformational leaders throughout history?

But transformational leaders do more than simply describe a dream or vision; they also offer a clear road map for attaining it. They tell their followers how to get *there* from *here*. This is crucial, for a vision that seems out of reach is unlikely to motivate people to try to reach it.

Third, transformational leaders engage in what Conger (1991) terms *framing*: They define the purpose of their movement or organization in a way that gives meaning and purpose to the actions they request. Perhaps the nature of framing is best illustrated by the well-known story of two stonecutters working on a cathedral in the Middle Ages. When asked what they were doing, one replied,"Cutting stone, of course." The other replied, "Building the world's most beautiful temple to the glory of God." Which person would be more likely to expend extraordinary effort? The answer is obvious.

In sum, the profound effect of charismatic or transformational leaders is not a mystery. Rather, it results from a combination of traits and actions, plus establishment of a special relationship with followers. Together, these factors permit such leaders to change their groups, their societies, or the world; and this is why we read about them in history books decades or even centuries after they are gone.

KEY POINTS

- Leadership is a process in which one member of a group (its leader) exerts influence over other members toward the attainment of common goals.
- Growing evidence suggests that leaders do differ from other persons in certain respects.
- One characteristic that plays a key role in leaders' effectiveness is flexibility.
- Transformational or charismatic leaders exert profound effects on their followers and often on entire societies.

HUMAN FACTORS: Designing for Effectiveness and Safety

Human beings, we've seen throughout this text, have an impressive capacity to adapt to the environment. Our abilities to perceive the external world, to acquire new information, to remember it, and then to reason about it, are all excellent. Yet we do have limitations in all these respects. Recognition of this fact is central to the field of *human factors* (or *ergonomics* as it is sometimes known). In fact, the guiding principle of this field might be stated this way: *All tools, equipment, and systems used by human beings should be designed to maximize the ease, safety, and effectiveness with which they can be used, and doing so*

often requires careful attention to human abilities and limitation (Sanders & McCormick, 1993). In their research and consulting activities, human factors psychologists consistently seek to accomplish this task by applying their knowledge about basic aspects of human behavior. Fortunately, their advice is often heeded; but *un*fortunately, not always. In this section we'll consider what human factor psychologists recommend with respect to such issues as the *display of information* and the *design of controls and workplaces*, and also what may happen when their advice is ignored.

Visual Displays: Principles and Applications

In 1985 I set out to buy a new car. That year, many models featured a new kind of speedometer. Instead of the standard round gauge with a pointer, many cars had a digital display in which bars of light moved across the screen. The bars changed color, from green to amber to red, as speed increased. I test-drove many cars with this system and found it both distracting and irritating. The result? I bought a car with the standard speedometer. Millions of drivers must have felt the way I did, because today the "improved" type of speedometer has largely vanished.

This example calls attention to an important fact: some kinds of **visual displays**—displays that present information visually—are easier to notice and understand than others. This is true both when the information is presented in static form, as in a sign or printed symbol, and when it is *dynamic*—when the information is changing, so the display, too, must change to reflect these shifts. Speedometers, of course, present visual displays of dynamic information, but there are many other situations in which this kind of information is important: gauges indicating the temperature of various fluids, the pounds of pressure inside a system, the altitude (as in a plane), and so on. How should such gauges be designed so that they can be read easily and accurately by the people who use them?

Literally hundreds of studies have been conducted by human factors psychologists to answer this question, and several basic principles have emerged from this work (Sanders & McCormick, 1993). First, pointers moving against a fixed scale are usually easier to read than the opposite (a moving scale and a fixed pointer). Thus, the moving needle of a speedometer is a good arrangement. Second, if increases in the units being measured are related to changes in the display that we naturally interpret as *up* or *higher*, ease of reading is increased. Since we tend to interpret clockwise directions as *higher*, standard speedometers are effective in this respect, too. Third, it's important to make gradations on the scale clear and easy to read. If you've ever had to hold a thermometer or other instrument with a visual display closer to your eyes (or farther away) because you couldn't tell where the pointer was, you are familiar with the importance of clear scale gradations.

In addition to these basic principles, many other factors influence the ease with which people can read dynamic displays of visual information. For example, different colors for different zones (one color for "normal," another for "caution," and a third for "danger") can be helpful (Sanders & McCormick, 1993). Similarly, under conditions where individuals must respond quickly to a large amount of incoming information, displays in which such information is presented in the same location in succession can often be superior to displays in which such information is shown at different locations (Uhlarik & Joseph, 1992). In sum, there do appear to be right and wrong ways to design visual displays, and careful attention to these principles can result in gauges and other instruments that are as easy to use as possible.

Visual Displays: *Displays that present information visually.*

Designing Effective Warnings: Danger!—Unless Human Factors Principles Are Considered One especially important use of visual displays is in **warnings**—messages designed to alert users of various products and services, or the general public, to potential hazards. Warnings often present information about how to avoid these hazards, as well as some indication of when and where the danger is most likely to be encountered. Unfortunately, many people tend to ignore warnings, thus placing themselves and others at considerable risk. This raises an important practical question: How can compliance with warnings be increased? We considered this topic briefly in chapter 3, but it is so important that it is worth returning to here, especially since it is a major topic of current research in human factors psychology.

First, as pointed out in chapter 3, in order for a warning to influence behavior, it must be *noticed* by its intended audience. This means that warning signs and messages must be both legible (or audible) and attention-getting. Some factors that increase the attention-getting properties of warnings are size, graphical design, color, and "active" elements, such as blinking lights or flags. In this regard, I'm reminded of an amusing and attention-getting type of road sign I saw recently while driving through the South of France: a bigger-than-life-size model of a police officer, which waved a large red flag. It was impossible to miss this figure, and it *did* cause me to slow down immediately—laughing as I did so.

After they notice a warning, people must be able to *understand* it, so it is essential that warnings be simple and to the point. Since chapter 3 covered this issue, I won't return to it here. Suffice it to say that warnings should be clear, brief, and to the point.

Finally, noticing and understanding a warning is not enough: What we really want is for people to *comply* with it. What factors increase such compliance? Fortunately, many are useful in this respect. One approach that seems especially promising is the use of *interactive warnings*—ones that require users to do something either before or while using a product (Hunn & Dingus, 1992). The benefits of such warnings are illustrated very clearly in a recent study by Duffy, Kalsher, and Wogalter (1993).

These researchers placed three different warnings on an extension cord. One of these was a simply a tag indicating that no more than two plugs should be connected to the extension cord at one time. Two others were interactive labels: They contained the same message as the tag, but users had to remove the plastic pieces on which these words were written before an appliance could be plugged into the extension cord. One of these interactive warnings was brightly colored in orange, while the other was gray. (In addition, there was a control condition in which no warning was present.) At one point during the session, the experimenter left the room; before doing so, this person asked the participants to help out by plugging in a television, a VCR, and videotape rewinder. By later examining how participants accomplished these tasks, the experimenter could determine whether they had complied with the warning on the extension cord. As shown in Figure 17.7 (on page 706), results were clear: Participants were much more likely to comply with the warning in the two interactive conditions than in the tag condition or in the control condition. These results indicate that interactive labels, because they require users actually to *do* something, may be an especially effective type of warning label.

Additional findings indicate that we can increase the effectiveness of warnings in changing behavior by personalizing the warnings—placing users' names on them (Wogalter et al., 1993)—and by placing warnings in locations where they don't compete with lots of visual clutter (Wogalter,

Warnings: Often Ignored

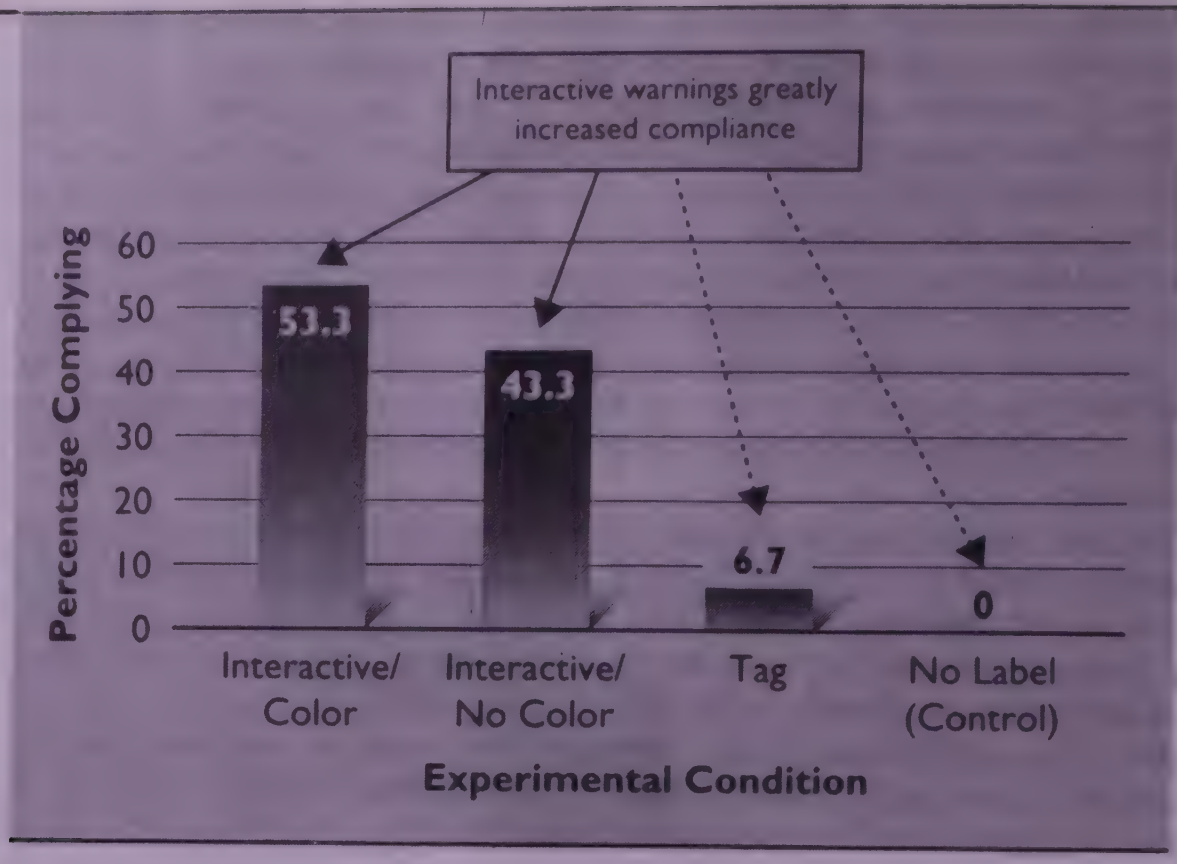
People often ignore signs warning them of danger. How can compliance with such warnings be increased? This is one important research topic in the field of human factors.

Warnings: *Messages designed to alert users of various products and services, or the general public, to potential hazards.*

FIGURE 17.7

The Benefits of Interactive Warnings

Interactive warnings—ones that required participants to remove a warning tag before using an extension cord—increased participants' compliance with the message on the tag.
(*Source:* Based on data from Duffy et al., 1993.)



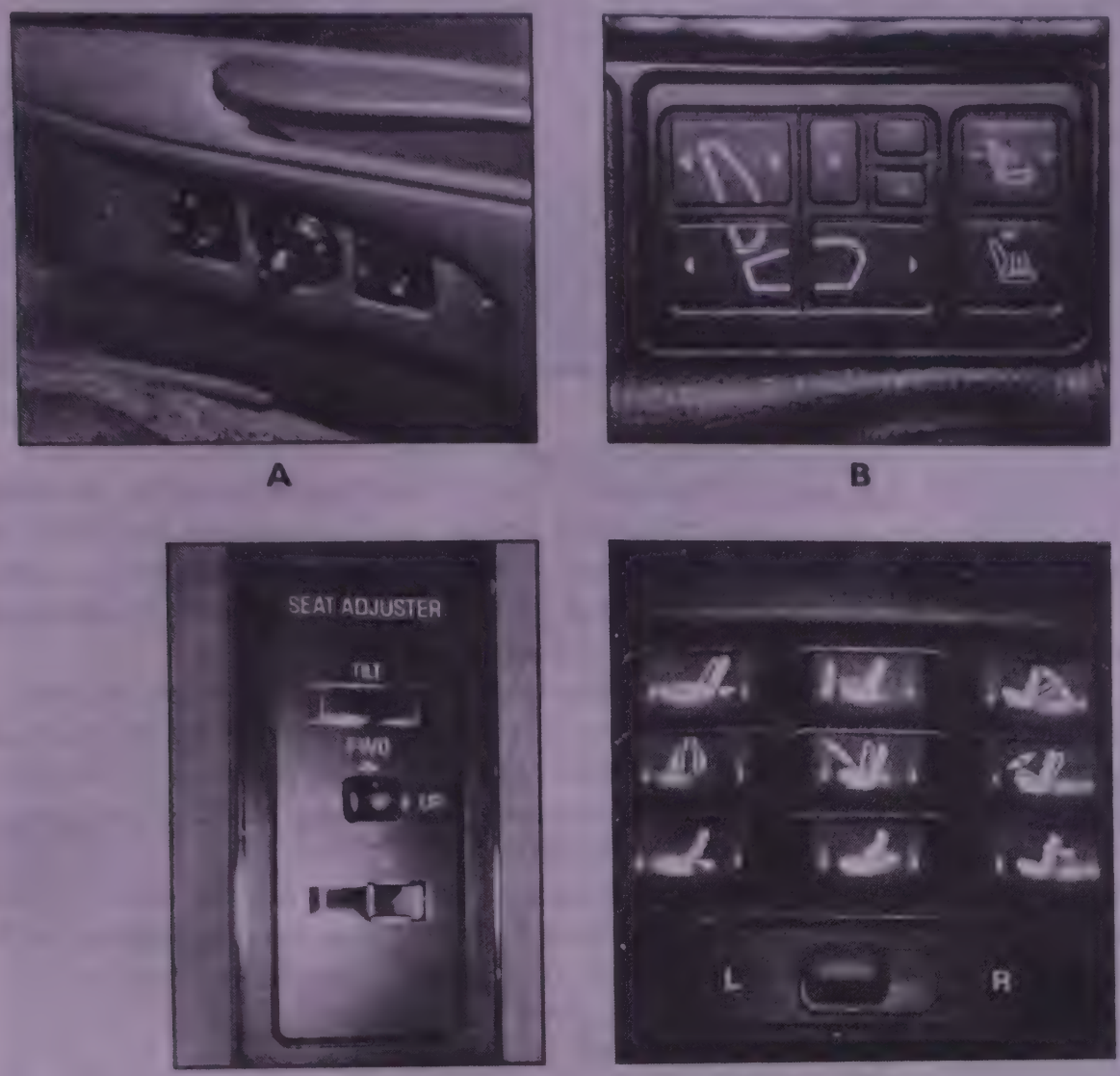
Kalsher, & Racicot, 1993). Finally, I'd like to note that there appear to be some interesting gender differences with respect to warning compliance. Specifically, although women and men report noticing warning signs about equally, women indicate that they are more likely to comply with them (Vredenburgh & Cohen, 1993). Since women also report that they view various high-risk activities as more dangerous than men do, these findings are not surprising (Vredenburgh & Cohen, 1993).

In sum, there are many steps that can be taken to increase the likelihood that people will notice, understand, and comply with warnings. The difficult task is not in determining what these are; rather, it is in getting governments and businesses to follow such guidelines.

CONTROLS: *"What Happens When I Turn This Dial . . . ?"*

Look at the controls in Figure 17.8. All are from new automobiles, and all serve the same function: to control power seats in these vehicles. It's obvious, however, that all are *not* equal from the point of view of users. Which would *you* find easiest to use? If you are like most people, the one in photo B. Looking at it, you can tell at a glance what will happen to the seat when you push each button. In contrast, you'll probably require some trial and error to figure out just what the controls in photos A and C accomplish. Most confusing of all are the controls in photo D. As two human factors experts put it: "Faced with the . . . seat control pictured in this photo, we wondered: Is this a seat control or a chiropractor's textbook?" (paraphrased from Andre & Segal, 1993, p. 6).

Unfortunately, confusing or misleading controls are far from rare. In fact, careful studies of the causes behind the Three Mile Island accident, in which a major nuclear-powered electric plant came very close to a meltdown, indicate that some of the errors by workers in that plant could be traced to such problems (Seminara, 1993). For instance, some controls had three positions labeled "Off," "Auto," and "On." Yet when the dial was pointing to "Auto,"



A B C D

FIGURE 17.8

Controls: Careful Design Is Essential

All these controls are designed to operate power seats in automobiles. However, they differ greatly in clarity or ease of use. The one in photo B is best, while the one in photo D is worst.
(*Source:* Andre & Segal, 1993, p. 5. Reprinted with permission from *Ergonomics in Design,* April 1993. Copyright 1993 by the Human Factors and Ergonomics Society. All rights reserved.)

the control was actually on "Off": It was spring-loaded so that it automatically returned to the middle position after being set to "Off." Some employees, however, did not know this and treated the control as if it were in the "Auto" position!

Obviously, then, clear and effective **controls** are an important consideration in the design of tools, equipment, and systems. What principles should guide the design of controls? Human factors psychologists have found that the most important of these is **compatibility**—the degree to which controls operate in a manner consistent with human expectations. For example, most people expect that when they turn a knob in a clockwise direction, it will increase whatever function is being controlled: A light will get brighter, the temperature in an oven will increase, and so on. Similarly, people seem naturally to expect that moving a lever forward will increase the function being controlled, while pulling it back will reduce it. So a basic rule of design where controls are concerned is this: Make sure that they follow this compatibility principle—that they do what most people expect them to do.

Controls: *Devices that permit human beings to operate and direct tools, equipment, or systems.*

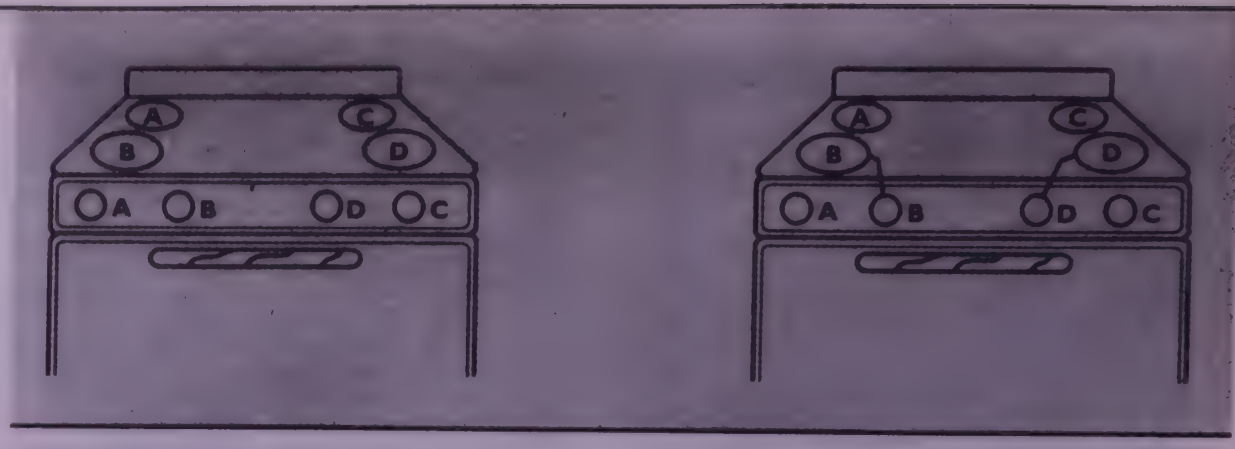
Compatibility: *The degree to which controls operate in a manner consistent with human expectations or tendencies.*

This sounds so simple and natural that you may be wondering why complications ever arise. One answer is that in some situations, we don't have clear-cut expectations about the operation of controls. Look at the controls in the left-hand drawing of Figure 17.9 (on page 708). Which knob controls which burner? Several arrangements are possible, so there is considerable uncertainty and therefore lots of room for error, compounded by the fact that

FIGURE 17.9

When Compatibility Needs a Boost

Look at the left-hand drawing. Can you guess which knob controls each burner? Since people differ in their expectations concerning this relationship, adding lines such as those in the right-hand drawing can be very helpful.



different stove manufacturers actually use different arrangements. In cases such as this one, extra information is needed and should be provided to users. A solution that works very well in this context is shown in the right-hand drawing of Figure 17.9. Drawing lines from the controls to the burners virtually eliminates errors (Osborne & Ellingstad, 1987).

In other situations, we *do* have expectations about how controls operate—but unfortunately our expectations are out of synch with the way the controls actually operate. A dramatic illustration of this kind of problem is provided by *anti-lock brakes*, designed to prevent accident-causing skids on wet or icy pavements. When these brakes were introduced, it was expected that they would prevent many accidents, so insurance companies offered reduced premiums for cars equipped with anti-lock brakes. More than 10 million automobiles now have such brakes in the United States alone, so it has recently become possible to compare the accident rates, and costs, of cars with and without such brakes. The results? No difference! How can this be so? The field of human factors provides a ready answer and one that was largely overlooked by safety experts *without* training in this field (Miller, 1994). Apparently, when most drivers feel their vehicle beginning to skid, they pump the brakes—the correct response with regular brakes. But in fact, that's the *wrong* thing to do when a car has anti-lock brakes; in that case the correct response is to apply steady pressure to the brake pedal. Before the benefits of anti-lock brakes can be fully realized, therefore, it will be necessary either to change the way such brakes operate, so that pumping the brake *is* correct, or to retrain millions of drivers to use this particular control (the brake pedal) in a new manner.

In addition to turning equipment on and off and regulating the level of various functions, people are often called on to perform another task where controls are concerned—**tracking**. This involves continuous control of some function in order to stay as close to a target value as possible. Whenever you drive a car you are involved in tracking, as you constantly make small adjustments in the steering wheel to remain on track—that is, in your lane. Human beings are quite good at this task, but because we cannot process information instantaneously, there is some lag between changes in a target and our responses to these changes. This delay often plays a tragic role in automobile accidents, but it is also important in many other tasks involving continuous tracking of a target. Performance on complex tracking tasks such as flying an airplane—which, during landing, involves simultaneous tracking of speed, altitude, and position—can be aided in several ways. For example, *predictor displays* can provide us with indications of where our vehicle, or the system, will be in five, ten, or twenty seconds. This helps us to make the rapid adjustments necessary to stay on track (Sanders & McCormick, 1993).

***Tracking:** Tasks, such as driving, in which individuals make adjustments to approach as closely as possible to some target value.*

An entirely new set of problems relating to controls has arisen in recent years, as computers have assumed an increasing role in regulating many

functions. In such cases, human beings exert *supervisory control*: They tell the machine or computer what they wish to accomplish, and the program takes over. A very simple example of supervisory control occurs when you use an automatic washing machine. You choose a specific cycle, and then mechanisms inside the washer take over and control water temperature, length of washing and spinning cycles, and so on. Supervisory control is increasingly common in manufacturing processes, where machines, under the guidance of computers, perform more and more functions previously carried out by people or at least controlled directly by them.

Even when computers control many aspects of production, however, human beings must still be present to oversee, and program, the computers. So, although the specific issues relating to controls may change, their effective design remains an important issue even in the most modern automated factories.

KEY POINTS

- **Visual displays present information visually. Many factors influence the clarity of such displays.**
- **Dynamic displays present information about changing values, such as speed or altitude. Such displays are usually easier to read when they use a moving pointer against a fixed scale.**
- **Warnings alert users of products, or the general public, to the presence of potential hazards. Several factors influence the extent to which warnings are noticed, understood, and obeyed. Interactive warnings seem to be especially effective.**
- **Controls permit human beings to operate tools, equipment, and systems. If controls do not follow the compatibility principle—that is, if they don't operate in the ways we expect—they can be very confusing.**
- **We often use controls for tracking, in which we attempt to stay as close as possible to some target value. In addition, controls may involve supervisory control, in which users set basic values and then some intermediary mechanism such as a computer actually operates the equipment.**

WORKPLACE ENVIRONMENTS: Planning for Productivity and Well-Being

When I was a new assistant professor, I was assigned—of course!—to the least desirable office in my department. It was dingy and cramped and had no outside window. The walls were made of glorified cardboard, so I could hear every sound from the hall outside; and there was no air conditioning outlet, so it was *hot*. In fact, temperatures regularly reached the upper 80s in the afternoon, from April through October. (This was South Carolina, where summers are long and often stifling.) The only air flow came from a ventilating fan high up on the wall, which connected with the adjoining office. Unfortunately, the occupant of that office smoked big, smelly cigars, so often the fan simply blew smoke into my room. What an experience! As the temperature rose each afternoon, my productivity declined. By 3:00 p.m. I usually had a fierce headache and could hardly think at all. My work was suffering and I knew it, but what could I do? I didn't seem to have any options.

Fortunately, this story has a happy ending: Space in a very desirable nearby building suddenly became available, so several of my senior colleagues moved there. This allowed *me* to move to a much better office, and the result was that my lectures, my research, and my disposition all improved dramatically.

There is an important point to this experience: People can't do their best work under adverse environmental conditions. Thus, workplace design is an important issue, deserving of careful attention. Actually, there are many aspects to such design, including (1) environmental factors such as the ones mentioned in the above incident and in chapter 16 (temperature, lighting, air quality, noise), (2) interpersonal aspects of work spaces, including crowding, privacy, and general office layout, and (3) the arrangement of components within physical work spaces to take account of the dimensions and characteristics of the human body. We'll focus here on environmental factors and interpersonal aspects of work settings.

The Physical Environment of Work Spaces: Effects on Performance

A large body of evidence indicates that physical aspects of work spaces can strongly affect performance on many different tasks (Baron, 1994; Sundstrom & Sundstrom, 1986). Among the variables that have received most attention in this regard are temperature, air quality, illumination, and noise: all the factors I had to contend with in my first—and worst—office.

Air quality. Breathing polluted air can have negative effects on both personal health and task performance. Substances such as carbon monoxide, airborne particles (dust, pollen, and so on), and oxides of nitrogen and sulfur are common in major cities and many industrial settings; and all have been shown to have adverse effects. Exposure to such substances can produce an *air pollution syndrome* that includes headache, fatigue, insomnia, irritability, and depression, and can adversely affect performance on many tasks, especially those involving reaction time and manual dexterity (Baron, 1994; Briesacher, 1971). In addition, cigarette smoke is very unpleasant for nonsmokers and has been found to serve as both a distractor and a source of annoyance (Zillmann, Baron, & Tamborini, 1981).

Temperature. Exposure to temperatures people find uncomfortably warm or uncomfortably cool can reduce performance on a wide range of tasks, especially ones requiring considerable cognitive effort—recording and decoding signals, fine eye-hand coordination, and vigilance tasks in which a person must stay alert to detect changes in events or displays (e.g., Bell et al., 1990). But what, precisely, *are* comfortable temperatures? Large individual differences exist with respect to preferred ranges, but many persons dressed in normal indoor clothing report feeling most comfortable at a temperature between 20 and 25 Celsius (68 to 78 Fahrenheit). Men tend to prefer slightly lower temperatures than women, perhaps because they have higher blood pressure and greater blood circulation to their extremities (Grivel & Candas, 1991). Preferred temperature ranges also vary with the kind of activities being performed: The more strenuous work activities are, the lower the preferred temperature (Ramsey & Kwon, 1988). Another complexity is introduced by the fact that people experience *acclimatization* to both high and low temperatures after several days' exposure to them. As a result, they can work more productively than was true when they first experienced these temperatures (Strydom et al., 1986).

Noise. Prolonged exposure to high levels of noise (approximately 85 decibels or higher, depending on length of exposure) can produce permanent damage to our hearing, so this is a serious matter in the design of any work setting. In addition, noise well below the levels that produce hearing loss can interfere with performance on many kinds of tasks, especially those requiring a high degree of cognitive effort (Sanders & McCormick, 1993). Such effects appear to be especially pronounced when noise is unpredictable—when it occurs irregularly. A very clear illustration of the detrimental impact of noise is provided by a study conducted by Nagar and Pandey (1987). These researchers exposed male participants to two different levels of noise or no noise while the participants performed two cognitive tasks: reading a story and answering questions about it, and unscrambling word puzzles. Results indicated that the higher the level of noise, the worse participants' performance was.

Countering the effects of negative work environments. Fortunately, means exist for countering the adverse effects of all of the factors described above, and so for enhancing the performance and well-being of workers.

Heating and air-conditioning equipment plus highly effective new insulating materials offer excellent—and energy-efficient—control over indoor temperatures. Similarly, devices and systems have been developed for removing many pollutants from the air in work settings. Some of these, which make use of what is known as *true HEPA* (High Efficient Particulate Arresting) filters, can remove more than 99.75 percent of all dust and other particles down to a size of 0.3 micron from the air. (Many bacteria are larger in diameter than 0.3 micron.) Finally, people can be protected from exposure to dangerously high levels of noise through the use of effective ear-covering protective devices. And distracting and unpleasant noise at lower levels can be reduced in several ways. These include redesigning equipment so that it emits less noise, using sound-absorbing materials in barriers and on large surfaces, and using equipment that emits *white noise*—a mixture of many different frequencies. White noise effectively masks distracting sounds produced by equipment, ringing telephones, the human voice, and other sources. A device that combines air filtration, noise control, and other environment-enhancing features is shown in the photo at the right. While this product is designed primarily for use in relatively small rooms (private offices, dorm rooms, bedrooms), the principles it incorporates can readily be applied to larger areas as well. (By the way, I'm the inventor of this product and hold two U.S. patents on it. This is one concrete way in which I've tried to put the results of systematic research—my own and that of many other psychologists—to practical use.)

ONE PRODUCT FOR IMPROVING THE PHYSICAL ENVIRONMENT OF WORK SETTINGS

The device shown here (patented by R. A. Baron and F. Haber) combines high-efficiency air filtration with noise control and other features to improve the physical environment of an office—or any other small room (for example, bedroom or dorm room).

INTERPERSONAL ASPECTS OF WORK SPACE DESIGN. Look at the photos below. In which office would you most prefer to work? Most people express a preference either for an individual room or cubicle (photo B), or for the large *open* or *landscaped* office design shown in photo C—a design in which people who work together are grouped near each other. Very few persons prefer the *bullpen* layout shown in photo A, although this design is still quite common in many work settings. Why do most people dislike this design? Partly because it fails to afford individuals privacy or any way to personalize their work areas (Sundstrom & Sundstrom, 1986). Rather, there is a total uniformity of work space, except for higher-status persons, who generally occupy offices arranged around the outside of the "bullpen." In addition, individuals often report feeling more crowded in the bullpen-type arrangement, reactions often associated with reduced productivity (Bell et al., 1990; Nagar, Pandey, & Paulus, 1988).

Because open-office or landscaped designs offer certain advantages—for example, they seem to enhance communication among people working in them—they have been adopted by many organizations. Yet they are not without disadvantages. Compared to private offices or cubicles, they involve

OFFICE DESIGN: AN IMPORTANT FACTOR IN PRODUCTIVITY

In which of these three offices would you prefer to work? All three designs offer some advantages and disadvantages, but the one on the right—a *landscaped* office—has been adopted by a growing number of companies in recent years.

A

B

C

Key Points

- Many environmental variables, including temperature, noise, and air quality, influence performance in work settings.
- The design of workplaces also affects performance. Landscaped or open offices have become increasingly popular. This type of work space layout involves decreased privacy and increased noise and distraction but also offers benefits.

increased opportunities for distraction and relatively high levels of noise. The key question, then, is this: How can an organization maximize the benefits of such office layouts, while reducing these potential costs? Research findings suggest that organizations can accomplish these goals through the following procedures:

- Take active steps to reduce noise (use sound-absorbing materials on all major surfaces, introduce noise-reducing equipment)
- Provide surfaces (horizontal or vertical) on which individuals can display their belongings and otherwise personalize their space
- Provide several easily accessible islands of privacy—rooms where people can hold confidential conversations, work undisturbed, and so on
- Design workstations so that visitors can sit down while speaking to occupants
- Provide adequate storage space (something that is often overlooked in the design of landscaped or open offices)
- Install telephones that ring silently

Through careful attention to these factors plus the environmental conditions discussed earlier, work spaces *can* be designed to be pleasant areas in which high levels of personal comfort and satisfaction are combined with maximum productivity. On the basis of research by human factors psychologists, I/O psychologists, and environmental psychologists, we already know a lot about how to accomplish these goals. The tricky part is convincing businesses that the costs of doing so are an excellent investment in their own futures.

Making Psychology Part of Your Life

Impression Management in Job Interviews: The Fine Art of Looking Good

Earlier in this chapter, I noted that getting the *right* job—one consistent with your interests and abilities—is very important for personal happiness. Yet it's definitely a tough world out there, with lots of stiff competition. For this reason, it's probably more important than ever to do well when interviewing for the job you want. Can psychology help in this respect? Absolutely. Psychologists have devoted much attention to the topic of *impression management* (or *self-presentation*)—efforts by individuals to enhance the impression they make on others (Ashford & Tsui, in press; Wayne & Ferris, 1990). Here are some tips for successful interviewing based on the findings of this research.

1. *First, do your homework.* Interviewers often care deeply about their companies. Thus, they often ask questions designed to find out how much applicants know about their organizations. So, before the interview, *do your homework*—find out as much as you can about the company, what it does, how it functions, and so on. Demonstrating basic knowledge of this sort will get you off to a good start in many interviews.

2. *Do dress and groom appropriately.* Casual is definitely in as a style of dress, but don't assume that it's appropriate for a job interview. True, some companies have loosened their dress codes and permit employees to dress quite casually. Still, job interviews are

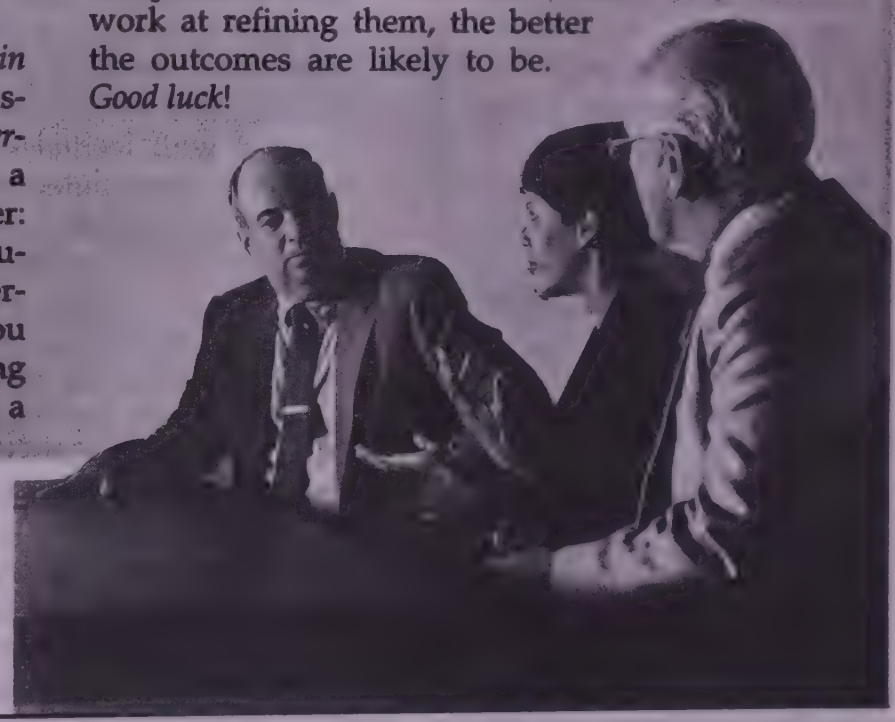
important, and interviewers will often down-rate applicants who haven't devoted careful attention to their dress and grooming. The key phrase to remember is *dress and groom appropriately.* Typically, this means standard business attire: suits for both men and women, avoiding flashy jewelry or too much makeup. And if you use perfume or cologne, do so sparingly: Research findings indicate that it's very easy to overdo it in this area (e.g., Baron, 1986, 1989).

3. *Engage in self-enhancing tactics—but don't overdo it.* In the discussion of social influence in chapter 16, we saw that there are many things we can do to increase others' liking for us. Several of these tactics involve what has been termed *self-enhancement*—putting yourself in the most favorable light possible. Among the most useful are positive statements about your experience and competence (backed up by solid evidence); positive nonverbal cues (smiling, a reasonably high degree of eye contact, and an upright, alert posture); and an occasional *self-deprecating remark* (to indicate that despite your self-confidence and competence, you know that you're not perfect). The key with respect to all these tactics, though, is to avoid overdoing it. True; if you don't toot your own horn, who will? But coming across as overconfident and arrogant can prove costly. For this reason, moderation is usually the best policy.

4. *Engage in other-enhancing techniques—again, in moderation.* The other side of the coin, where increasing interviewers' liking for you is concerned, is *other-enhancement*: behaviors that put the *interviewers* in a favorable light or cause them to feel good. Remember: when people are in a good mood, they tend to evaluate everything around them—including other persons—more favorably (Baron, 1993). How can you accomplish this goal? Through such steps as agreeing with interviewers when this is feasible, showing a high degree of interest in what they say and their company, and offering a touch of flattery when appropriate. Again, though, be very careful: It's all too easy to overdo all of these procedures, with potentially disastrous results.

5. *Concentrate on jobs for which you are really qualified.* Interviewers typically have very hectic schedules: they must talk to many applicants in a short period of time. Thus, they often use initial screening questions or techniques to determine if you are at all suited to the job in question, and they can tell very quickly if you are. So don't schedule interviews for jobs you are definitely *not* suited to perform. Yes, longshots do sometimes succeed, but the chances of this happening are very low when you are dealing with experienced interviewers. The time and effort you put into such ventures is probably much better invested in preparing for interviews for jobs for which you *are* qualified.

6. *Practice, practice, practice.* None of the above procedures are very complicated, but using them effectively—and combining them in ways appropriate to your own personality—requires practice. So get some friends to help, and work on developing the skills you need. Few persons are naturals in the interview context; so the more often you practice your self-presentational behaviors and work at refining them, the better the outcomes are likely to be. *Good luck!*



The success of a job interview will depend on the impression you make on the interviewers.

Summary and Review of Key Points

Industrial/Organizational Psychology: The Systematic Study of Behavior in Work Settings

Key Terms:

industrial/organizational psychology, p. 676
human factors, p. 676
goal-setting theory, p. 678
equity theory, p. 680
cafeteria-style benefit plans, p. 683
job design, p. 683
job enlargement, p. 683
job enrichment, p. 683
computer-based work monitoring, p. 685
social facilitation, p. 686
performance appraisals, p. 686
halo effects, p. 688
leniency effects, p. 689
behaviorally anchored rating scales, p. 692
distributional ratings of performance, p. 693
job satisfaction, p. 694
organizational citizenship behavior, p. 699
leadership, p. 700
great person theory of leadership, p. 700
normative theory, p. 701
situational leadership theory, p. 701
transformational leaders (charismatic leaders), p. 702

- Industrial/organizational psychology studies all aspects of behavior in work settings and the nature of work settings themselves.
- Work motivation plays an important role in the performance of many work-related tasks. Expectancy theory suggests that people will expend effort on various tasks only to the extent that they expect such effort to improve performance, believe that good performance will be rewarded, and desire the rewards offered.
- Goal setting, the process of establishing clear goals for various tasks, often greatly increases performance. Goal-setting theory proposes that the beneficial effects of goal setting stem from several factors, including comparison between present performance and the goal, feelings of self-efficacy, clarification of expected performances, and improved strategies for task performance.
- Equity theory suggests that people compare the ratio of their own inputs and outcomes to the ratio of inputs and outcomes for other comparable persons. If these ratios are roughly equal, then equity exists. If the ratios are not equal, feelings of inequity may arise.
- I/O psychologists have not only developed theories of work motivation but devised several techniques for enhancing motivation. In addition to goal setting, such procedures include job design, enhancing jobs to maximize motivation. This can involve job enlargement or job enrichment. Another technique is computer-based work monitoring, which is somewhat controversial at present.
- Performance appraisals involve assessments of employees' performance coupled with feedback about these ratings. Performance appraisals are subject to many potential forms of bias, including attributional errors, halo effects, leniency effect, and stereotypes.
- Although many errors in performance appraisal stem from the cognitive limitations of raters, others may involve the nature of the rating forms used. Two techniques for reducing such errors are behaviorally anchored rating scales (BARS) and distributional ratings of performance.
- Job satisfaction, the extent to which people like or dislike their jobs, is an important work-related attitude. Job satisfaction is influenced by both person-related and organization-related factors; even genetic factors seem to play a role.
- Job satisfaction is modestly related to absenteeism and voluntary withdrawal by employees. It is also modestly related to individual performance. Recent findings indicate that it may be more strongly linked to organizational performance.
- Leadership is a process in which one member of a group (its leader) exerts influence over other members toward the attainment of common goals. Growing evidence offers support for the view that certain traits play a role in leadership. Among these, flexibility is one of the most important. Transformational or charismatic leaders exert profound effects on their followers and often upon entire societies. This impact stems both from traits they possess and the special type of relationships they establish with their followers.

HUMAN FACTORS: DESIGNING FOR EFFECTIVENESS AND SAFETY	• Visual displays present information visually. Many factors influence the clarity of such displays. Dynamic displays present information about changing values such as speed or altitude. Such displays are usually easier to read when they use a moving pointer against a fixed scale and when higher values are consistent with what we normally expect to be higher. • Warnings alert users of products, or the general public, to the presence of potential hazards. Several factors influence the extent to which warnings are noticed, understood, and obeyed. Interactive warnings seem to be especially effective. • Controls permit human beings to operate tools, equipment, and systems. If controls do not follow the compatibility principle—if they don't operate in the ways we expect—they can be very confusing. We often use controls for tracking, in which we attempt to stay as close as possible to some target value, as in driving. In addition, controls may involve supervisory control, in which users set basic values and then some intermediary mechanism such as a computer actually operates the equipment. • Many environmental variables, including temperature, noise, and air quality, influence performance in work settings. The design of workplaces also affects performance. Landscaped or open offices have become increasingly popular. This type of layout involves reduced privacy plus increased noise and distraction but also offers several benefits.

Key Terms:

visual displays, p. 704
warnings, p. 705
controls, p. 707
compatibility, p. 707
tracking, p. 708

CRITICAL THINKING QUESTIONS

APPRAISAL	Work and work-related activities play an extremely important role in most people's lives. Yet the field of industrial/organizational psychology has often been neglected in psychology textbooks. Why do you think this was true in the past? And why is the situation changing now, so that more texts include coverage of this field?
CONTROVERSY	Industrial/organizational psychologists have sometimes been accused of being "tools of management," because they devote so much attention to developing ways of increasing work motivation and productivity. In their own defense, I/O psychologists point out that they also study ways of making work and work settings more pleasant for employees. What are your views on this continuing controversy?
MAKING PSYCHOLOGY PART OF YOUR LIFE	The chances are quite good that at some point in your career, you will be asked to evaluate others—to assess their performance. Now that you know how complex this process can be, and how easily it can be affected by various forms of error, do you think you will approach it differently than might otherwise have been the case? For example, what safeguards might you adopt to help yourself do a better job in this important task?

Appendix

Statistics: Uses—and Potential Abuses

At many points in this text, I've noted that one benefit you should gain from your first course in psychology is the ability to think about human behavior in a new way. This appendix will expand on that theme by offering a basic introduction to one essential aspect of psychological thinking: **statistics**.

What does this special form of mathematics have to do with psychology or thinking like a psychologist? The answer involves the fact that all fields of science require two major types of tools. First, scientists need various kinds of equipment to gather the data they seek. Obviously, this equipment differs from field to field; for example, biologists use microscopes, astronomers employ telescopes, and geologists wield hammers (or even dynamite!) in their work.

Second, all scientists need some means for interpreting the findings of their research—for determining the *meaning* of the information they have acquired and its relationship to important theories in their field. Again, this varies from one science to another. In most cases, though, some type of mathematics is involved. Psychology is no exception to this general rule: To understand the findings of their research (and, hence, important aspects of human behavior), psychologists make use of *statistics*—or, more accurately, *statistical analysis* of the data they collect.

As you'll soon see, statistics are a flexible tool and can be used for many different purposes. In psychology, however, they are usually employed to accomplish one or more of the following tasks: (1) *summarizing* or *describing* large amounts of data; (2) *comparing* individuals or groups of individuals in various ways; (3) determining whether certain aspects of behavior are *related* (whether they vary together in a systematic manner); and (4) *predicting* future behavior from current information. In the pages that follow we'll consider each of these major uses of statistics by psychologists. After doing so, we'll explore several ways in which statistics can be abused—how they can be employed to disguise or conceal important facts rather than to clarify them.

Descriptive Statistics: Summarizing Data

Statistics: *Mathematical procedures used to describe data and draw inferences from them.*

Suppose that a psychologist conducts an experiment concerned with the effects of staring at others in public places. The procedures of the study are simple. He stares at people in stores, airports, and a variety of other locations, and he records the number of seconds until they look away—or until they approach to make him stop! After carrying out these procedures twenty times, he obtains the data shown in Table A.1. Presented in this form, the

scores seem meaningless. If they are grouped together in the manner shown in Figure A.1 (on page 718), however, a much clearer picture emerges. Now we can see at a glance that the most frequent score is about 4 seconds; that fewer people look away after 3 or 5 seconds; and that even fewer look away very quickly (after 2 seconds) or after a longer delay (6 seconds). This graph presents a **frequency distribution**: It indicates the number of times each score occurs within an entire set of scores. Here, the frequency distribution indicates how many times scores of 1, 2, 3, 4, 5, or 6 seconds were recorded in the study of staring.

A graph such as the one in Figure A.1 provides a rough idea of the way a set of scores is distributed. In science, however, a rough idea is not sufficient: more precision is required. In particular, it would be useful to have an index of (1) the middle score of the distribution of scores (their **central tendency**) and (2) the extent to which the scores spread out around this point (their **dispersion**). Such measures are provided by **descriptive statistics.**

	Number of Seconds until Person Either Looks Away or Approaches
Person 1	4
Person 2	4
Person 3	1
Person 4	4
Person 5	3
Person 6	2
Person 7	5
Person 8	3
Person 9	6
Person 10	5
Person 11	4
Person 12	4
Person 13	3
Person 14	3
Person 15	5
Person 16	4
Person 17	4
Person 18	2
Person 19	6
Person 20	5

Table A.1

Raw Data from a Simple Experiment

When a psychologist stares at strangers in a public place, these persons either look away or approach him in the number of seconds shown. Note that more people look away or approach after 4 seconds than any other value.

Measures of Central Tendency: Finding the Center

You are already familiar with one important measure of central tendency: the **mean,** or average. We calculate a mean by adding all scores and then dividing by the total number of scores. The mean represents the typical score in a distribution and in this respect is often quite useful. Sometimes, though, it can be misleading. This is because the mean can be strongly affected by one or a few extreme scores. To see why this is so, consider the following example. Ten families live on a block. The number of children in each family is shown in Table A.2 (on page 718). Adding these numbers together and dividing by ten yields a mean of four. Yet, as you can see, *not one family actually has four children.* Most have none or two, but one has eight and another has nineteen.

In cases such as this, it is better to refer to other measures of central tendency. One of these is the **mode**—the most frequently occurring score. As you can see, the mode of the data in Table A.2 is 2: More families have two children than have any other number. Another useful measure of central tendency is the **median**—the midpoint of the distribution. Fifty percent of the

Frequency Distribution: *The frequency with which each score occurs within an entire distribution of scores.*

Central Tendency: *The middle (center) of a distribution of scores.*

Dispersion: *The extent to which scores in a distribution spread out or vary around the center.*

Descriptive Statistics: *Statistics that summarize the major characteristics of an array of scores.*

Mean: *A measure of central tendency derived by adding all scores and dividing by the number of scores.*

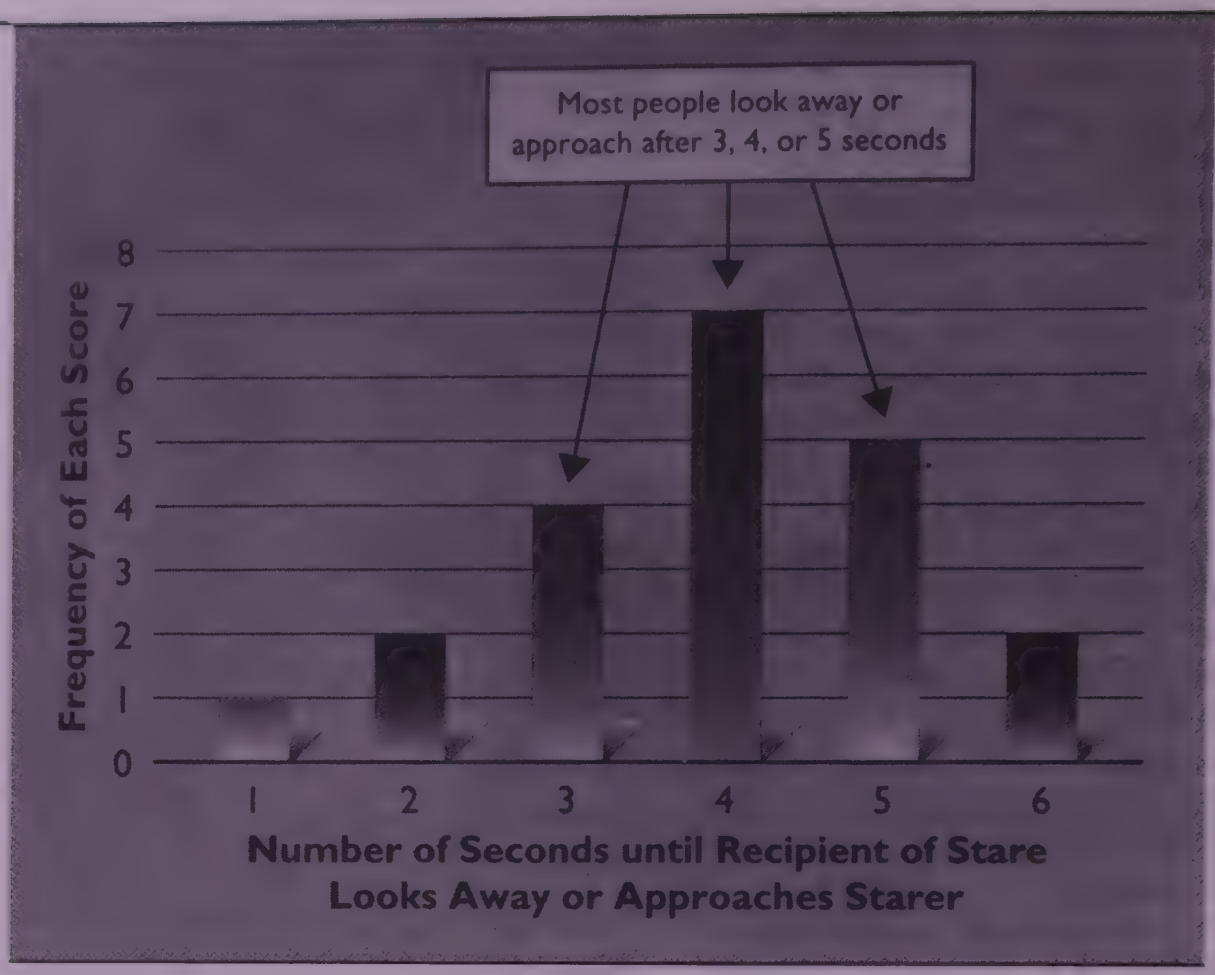
Mode: *A measure of central tendency indicating the most frequent score in an array of scores.*

Median: *A measure of central tendency indicating the midpoint of an array of scores.*

FIGURE A.1

A Frequency Distribution

In a *frequency distribution*, scores are grouped together according to the number of times each occurs. This one suggests that most persons react to being stared at within about four seconds.



scores fall at or above the median, while 50 percent fall at or below this value. Returning to the data in Table A.2, the median also happens to be 2: Half the scores fall at or below this value, while half fall at or above it.

As you can readily see, both the mode and median provide more accurate descriptions of the data than does the mean in this particular example. But please note that this is *not* always, or even usually, the case. It is true only in instances where extreme scores distort the mean. In fact, there is no single rule for choosing among these measures. The decision to employ one over the others should be made only after careful study of frequency distributions such as the one shown in Figure A.1.

TABLE A.2

How the Mean Can Sometimes Be Misleading

Ten families have a total of 40 children among them. The mean is 4.0, but, as you can see, not one family has this number of children. This illustrates the fact that the *mean*, while a useful measure of central tendency, can be distorted by a few extreme scores.

Range: *The difference between the highest and lowest scores in a distribution of scores.*

	NUMBER OF CHILDREN
Family 1	0
Family 2	0
Family 3	2
Family 4	2
Family 5	2
Family 6	2
Family 7	2
Family 8	3
Family 9	19
Family 10	8
	Total = 40 children
	Mean = 40/10 = 4.0

MEASURES OF DISPERSION: Assessing the Spread

The mean, median, and mode each tell us something about the center of a distribution, but they provide no indication of its shape. Are the scores bunched together? Do they spread out over a wide range? This issue is addressed by measures of *dispersion*.

The simplest measure of dispersion is the **range**—the difference between the highest and lowest scores. For example, the

range for the data on number of children per family in Table A.2 is 19 (19 – 0 = 19). Although the range provides some idea of the extent to which scores vary, it suffers from one key drawback: It does not indicate how much the scores spread out around the center. Information on this important issue is provided by the **variance** and **standard deviation**.

The variance provides a measure of the average distance between scores in a distribution and the mean. It indicates the extent to which, on average, the scores depart from (vary around) the mean. Actually, the variance refers to the average *squared* distance of the scores from the mean; squaring eliminates negative numbers. The *standard deviation* then takes account of this operation of squaring by calculating the square root of the variance. So the standard deviation, which is widely used in psychology, represents the average distance between scores and the mean in any distribution. The larger the standard deviation, the more the scores are spread out around the center of the distribution.

Variance: *A measure of dispersion reflecting the average squared distance between each score and the mean.*

Standard Deviation: *A measure of dispersion reflecting the average distance between each score and the mean.*

Normal Curve: *A symmetrical, bell-shaped frequency distribution. Most scores are found near the middle, and fewer and fewer occur toward the extremes. Many psychological characteristics are distributed in this manner.*

The Normal Curve: Putting Descriptive Statistics to Work

Despite the inclusion of several examples, this discussion so far has been somewhat abstract. As a result, it may have left you wondering about the following question: Just what do descriptive statistics have to do with understanding human behavior or thinking like a psychologist? One important answer involves their relationship to a special type of frequency distribution known as the **normal curve**.

While you may never have seen this term before, you are probably quite familiar with the concept it describes. Consider the following characteristics: height, size of vocabulary, strength of motivation to attain success. Suppose you obtained measurements of each among thousands of persons. What would be the shape of each of these distributions? If you guessed that they would all take the form shown in Figure A.2, you are correct. In fact, on each dimension most scores would pile up in the middle, and fewer and fewer

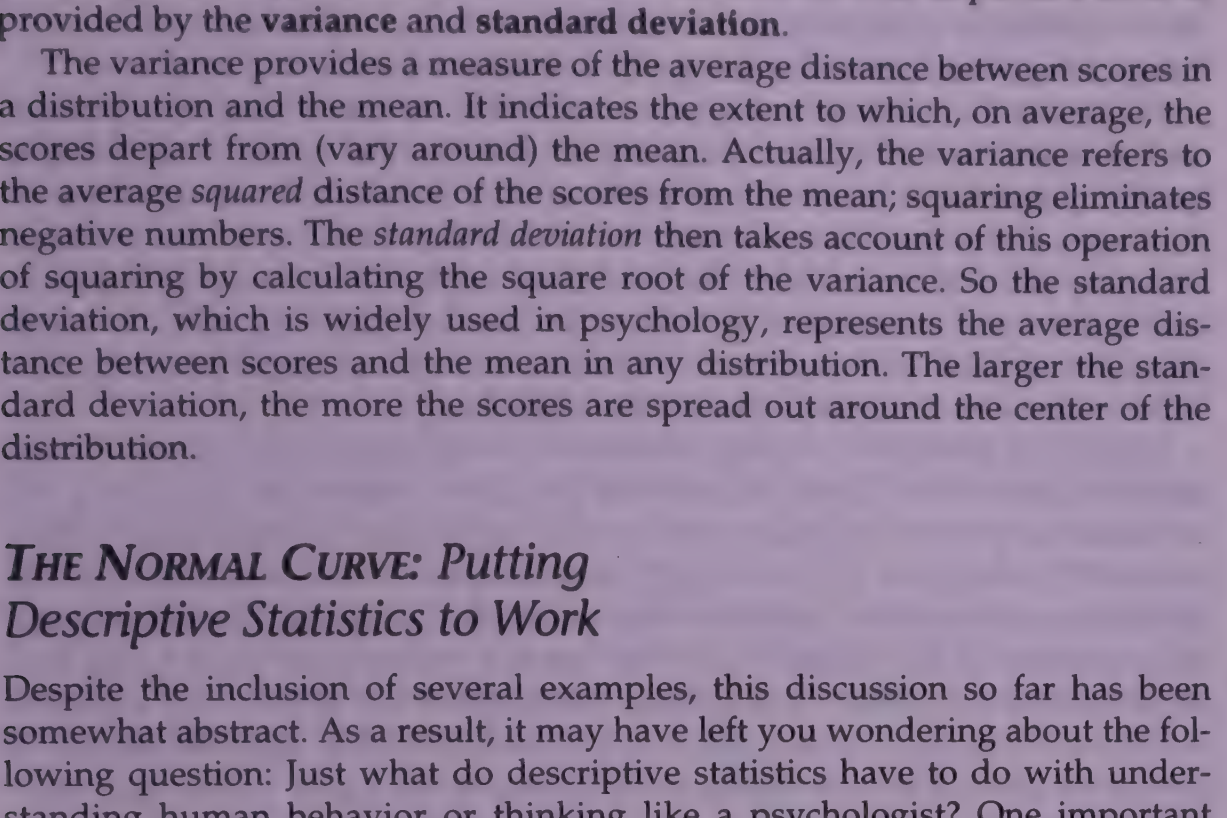


FIGURE A.2

The Normal Curve

On many dimensions relating to behavior, scores show the kind of frequency distribution illustrated here: the *normal* curve. Most scores pile up in the middle, and fewer and fewer occur toward the extremes.

scores would occur farther away from this value. In short, most people would be found to be average height, would have average vocabularies, and would show average desire for success; very few would be extremely high or low on these characteristics. We should add, by the way, that the normal curve applies to an amazingly wide range of human characteristics—everything from personality traits to cognitive abilities and physical attributes.

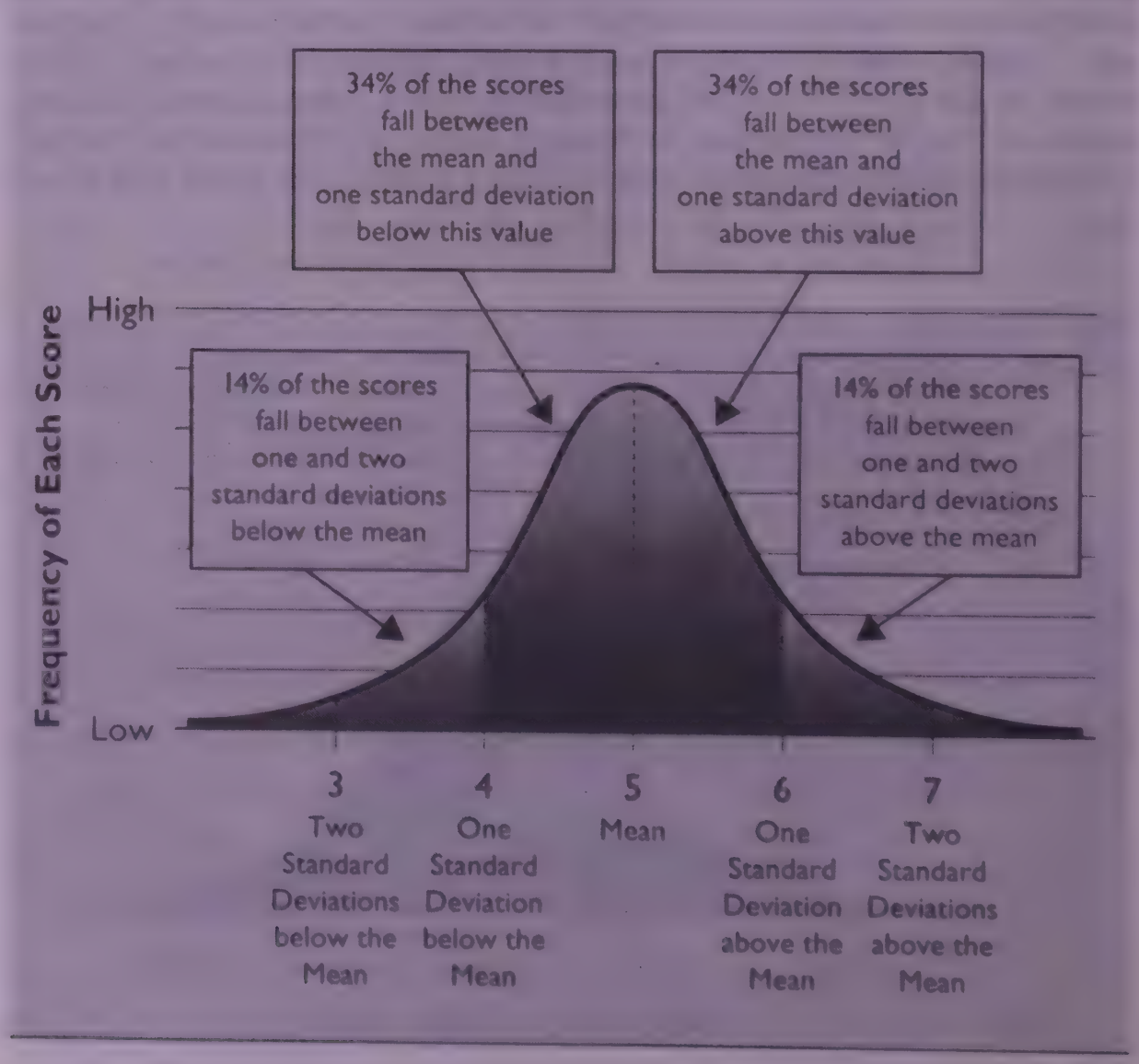
What does the normal curve have to do with the use of descriptive statistics? A great deal. One key property of the normal curve is as follows: Specific proportions of the scores within it are contained in certain areas of the curve; moreover, these portions can be defined in terms of the standard deviation of all of the scores. Therefore, once we know the mean of a normal distribution and its standard deviation, we can determine the relative standing of any specific score within it. Perhaps a concrete example will help clarify both the nature and the value of this relationship.

Figure A.3 presents a normal distribution with a mean of 5.0 and a standard deviation of 1.0. Let's assume that the scores shown are those on a test of desire for power. Suppose that we now encounter an individual with a score of 7.0. We know that she is high on this characteristic, but *how* high? On the basis of descriptive statistics—the mean and standard deviation—plus the properties of the normal curve, we can tell. Statisticians have found that 68 percent of the scores in a normal distribution fall within one standard deviation of the mean, either above or below it. Similarly, fully 96 percent of the scores fall within two standard deviations of the mean. Given this information, we can conclude that a score of 7 on this test is very high indeed:

FIGURE A.3

Interpreting Scores by Means of the Normal Distribution

Sixty-eight percent of the scores in a normal distribution fall within one standard deviation of the mean (above or below it). Similarly, fully 96 percent of the scores fall within two standard deviations of the mean. Thus, on a test with a mean of 5.0 and a standard deviation of 1.0, only 2 percent of persons attain a score of 7.0 or higher.



only 2 percent of persons taking the test attain a score equal to or higher than this one (refer to Figure A.3).

In a similar manner, descriptive statistics can be used to interpret scores in any other distribution, providing it approaches the normal curve in form. As noted above, a vast array of psychological characteristics and behaviors do seem to be distributed in this manner. The result: We can readily determine an individual's relative standing on any of these dimensions from just two pieces of information: the mean of all scores in the distribution and the standard deviation. Little wonder, then, that the normal curve has sometimes been described as a statistician's or psychologist's delight.

Now imagine that your first psychology test contains fifty multiple-choice items. You obtain a score of 40. Did you do well or poorly? If your instructor provides two additional pieces of information—the mean of all the scores in the class and the standard deviation—you can tell. Suppose the mean is 35, and the standard deviation is 2.50. The mean indicates that most people got a lower score than you did. The relatively small standard deviation indicates that most scores were quite close to the mean—only about twice this distance *above* the mean. Further—and here is a key point—this conclusion would be accurate whether there were 30, 100, or 500 students in the class, assuming the mean and standard deviation remained unchanged. It is precisely this type of efficiency that makes descriptive statistics so useful for summarizing even large amounts of information.

INFERENTIAL STATISTICS: Determining Whether Differences Are or Are Not Real

Throughout this book, the results of many experiments have been described. When these studies were discussed, differences between various conditions or groups were often mentioned. For example, we saw that participants exposed to one set of conditions or one level of an independent variable behaved differently from participants exposed to another set of conditions or another level of an independent variable. How did we know that such differences were real ones rather than differences that might have occurred by chance alone? The answer involves the use of **inferential statistics**. These methods allow us to reach conclusions about just this issue: whether a difference we have actually observed is large enough for us to conclude (to *infer)* that it is indeed a real or *significant* one. The logic behind inferential statistics is complex, but some of its key points can be illustrated by the following example.

Suppose that a psychologist conducts an experiment to examine the impact of mood on memory. (As you may recall, such research was discussed in chapter 6.) To do so, he exposes one group of participants to conditions designed to place them in a good mood: They watch a very funny videotape. A second group, in contrast, is exposed to a neutral tape—one that has little impact on their mood. Both groups are then asked to memorize lists of words, some of which refer to happy events, such as "party," "success." Later, both groups are tested for recall of these words. Results indicate that those who watched the funny tape remember more happy words than those who watched the neutral tape; in fact, those in the first group remember

Inferential Statistics: *Statistical procedures that permit us to determine whether differences between individuals or groups are ones that are likely or unlikely to have occurred by chance.*

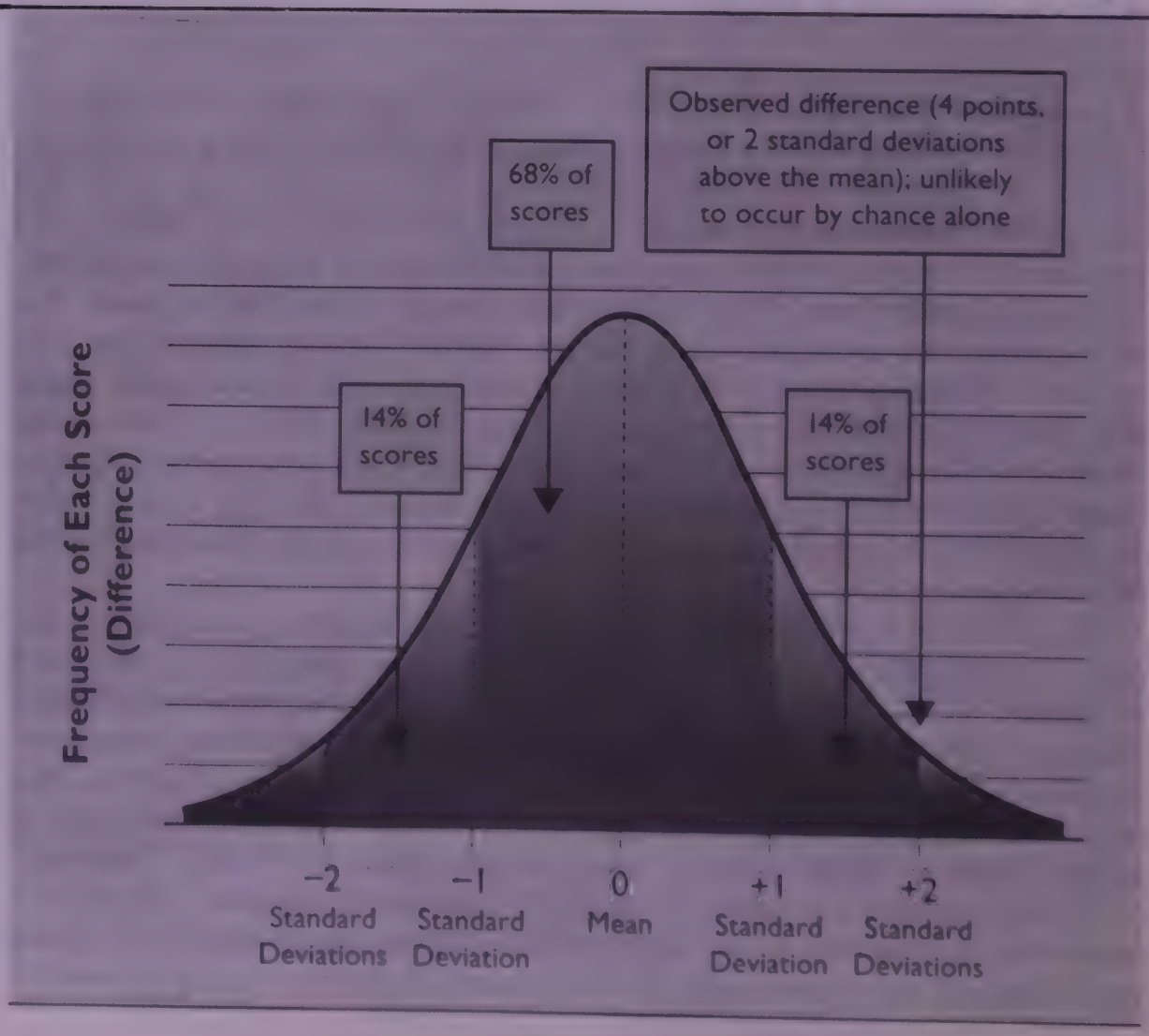
twelve happy words, while those in the second remember only eight—a difference of 4.0. Is this difference a real one?

One way of answering this question would be to repeat the study over and over again. If a difference in favor of the happy group were obtained consistently, our confidence that it is indeed real (and perhaps due to differences in subjects' mood) would increase. As you can see, however, this would be a costly procedure. Is there any way of avoiding it? One answer is provided by inferential statistics. These methods assume that if we repeated the study over and over again, the size of the difference between the two groups obtained each time would vary; moreover, these differences would be normally distributed. Most would fall near the mean, and only a few would be quite large. When applying inferential statistics to the interpretation of psychological research, we make a very conservative assumption: We begin by assuming that there is no difference between the groups—that the mean of this distribution is zero. Through methods that are beyond the scope of this discussion, we then estimate the size of the standard deviation. Once we do, we can readily evaluate the difference obtained in an actual study. If an observed difference is large enough that it would occur by chance only 5 percent (or less) of the time, we can view it as significant. For example, assume that in the study we have been discussing, this standard deviation (a standard deviation of mean differences) is 2.0. This indicates that the difference we observed (4.0) is two standard deviations above the expected mean of zero (please refer to Figure A.4). As you'll recall from our discussion of the normal curve, this means that the difference is quite large and would occur by chance less than 2 percent of the time. Our conclusion: the difference between the two groups in our study is *probably* real. Thus, mood does indeed seem to affect memory.

FIGURE A.4

Using Inferential Statistics to Determine Whether an Observed Difference Is a Real One

Two groups in a study concerned with the effects of mood on memory attain mean scores of 12.0 and 8.0, respectively. Is this difference *significant* (real)? Through inferential statistics, we can tell. If the study were repeated over and over, and the two groups did not really differ, the mean difference in their scores would be zero. Assuming that the standard deviation is 2.0, we know that the probability of a difference this large is very small—less than 2 percent. In view of this fact, we conclude that this finding is indeed significant.



Please note the word *probably* above. Since the tails of the normal curve never entirely level off, there is always some chance—no matter how slight—that even a huge observed difference is due to chance. If we accept a difference that really occurred by chance as being real, we make what statisticians describe as a Type I error. If, in contrast, we interpret a real difference as being one that occurred by chance, we make a Type II error. Clearly, both kinds can lead us to false conclusions about the findings of a research project.

CORRELATION AND PREDICTION

Does crime increase as temperatures rise? Does the chance of winning elections increase with a candidate's height? Does our ability to solve certain kinds of problems change with age? Psychologists are often interested in such questions. In short, they are concerned with whether two or more variables are *related*, so that changes in one are associated with changes in the other. Remember: This is quite different from the issue of whether changes in one variable *cause* changes in another. (If you're unclear about this distinction, refresh your memory by referring to chapter 1.)

In order to answer such questions, we must gather information on each variable. For example, assume that we wanted to find out if political fortunes are indeed related to height. To do so, we might obtain information on (1) the height of hundreds of candidates and (2) the percentage of votes they obtained in recent elections. Then we'd plot these two variables, height against votes, by entering a single point for each candidate on a graph such as those in Figure A.5 (on page 724). As you can see, the first graph in this figure indicates that tallness is positively associated with political success. The second points to the opposite conclusion, and the third suggests that there is no relationship at all between height and political popularity.

While such graphs, known as *scatterplots*, are useful, they don't by themselves provide a precise index of the strength of the relationship between two or more variables. To obtain such an index, we often calculate a statistic known as a **correlation coefficient**. Such coefficients can range from –1.00 to +1.00. Positive numbers indicate that as one variable increases, so does the other. Negative numbers indicate that as one factor increases, the other decreases. The greater the departure from 0.00 in either direction, the stronger the relationship between the two variables. Thus, a correlation of +0.80 is stronger than one of +0.39. Similarly, a correlation of –0.76 is stronger than one of –0.51.

Once we've computed a correlation coefficient, we can test its significance: We can determine whether it is large enough to be viewed as unlikely to occur by chance alone. Further, we can also compare correlations to determine if, in fact, one is significantly larger or smaller than another. The methods used for completing these tasks are somewhat different from those used for comparing means, but the logic is much the same.

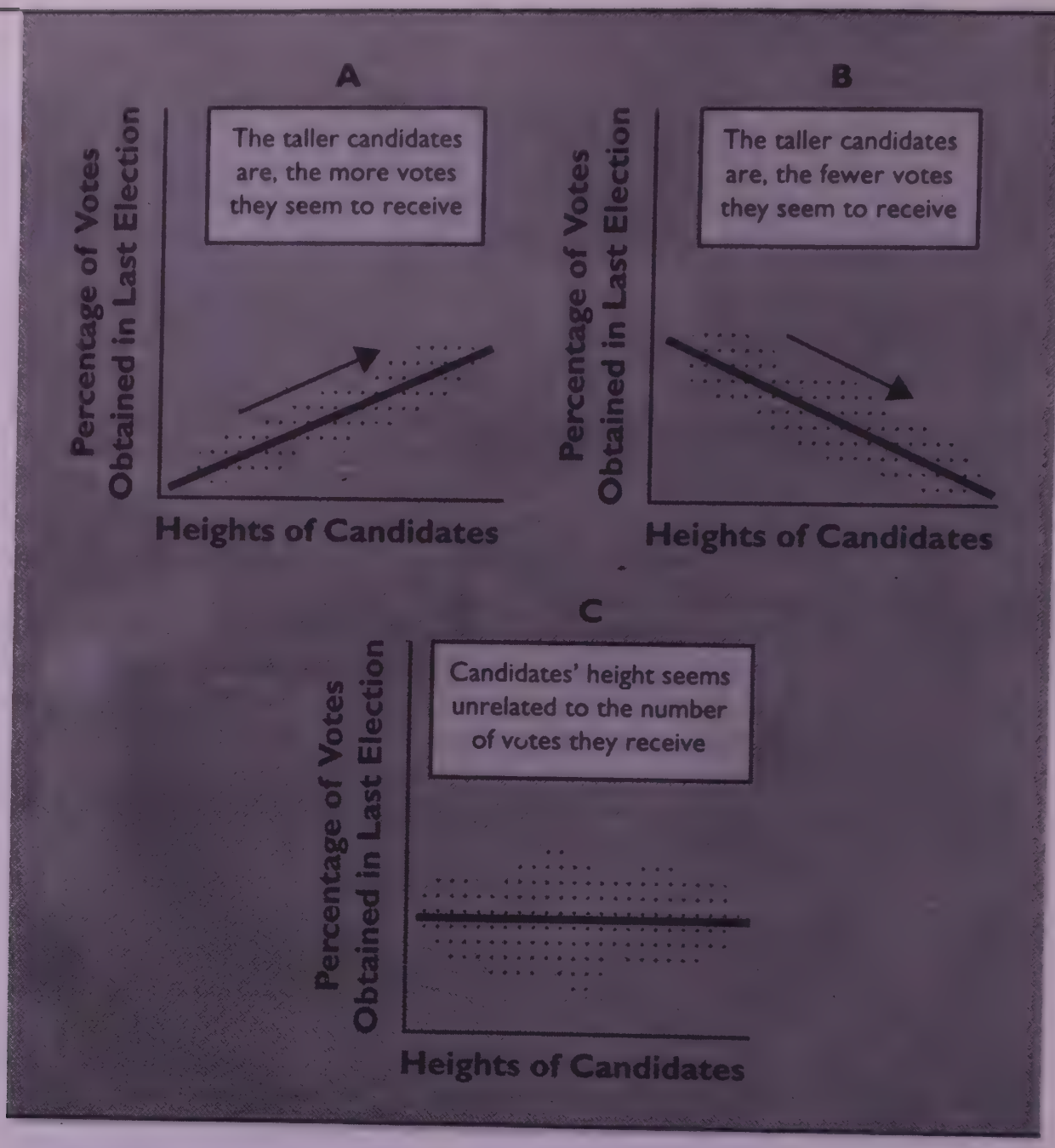
In addition to determining the extent to which two or more variables are related, statistical procedures also exist for determining the degree to which a specific variable can be *predicted* from one or more others. These methods of *regression analysis* are complex, but they are of great practical value. Knowing the extent to which performance can be predicted from currently available information—such as grades, past performance, or scores on psychological tests—can aid companies, schools, and many other organizations in selecting the best persons for employment or educational opportunities.

Correlation Coefficient: *A statistic indicating the degree of relationship between two or more variables.*

FIGURE A.5

Illustrating Relationships through Scatterplots

Is height related to success in politics? To find out, we measure the height of many candidates and obtain records of the percentage of votes they obtained. We then plot height against votes in a *scatterplot*. Plot A indicates a positive relationship between height and political success: the taller candidates are, the more votes they get. Plot B indicates a negative relationship between these variables. Plot C suggests that there is no relationship between these variables.



THE MISUSE OF STATISTICS: Numbers Don't Lie . . . or Do They?

A public figure once remarked, "There are lies, damned lies, and statistics!" By this, he meant that statistics are often used for purposes quite different from the ones we've discussed here. Instead of serving as a valuable basis for understanding scientific data, interpreting test scores, or making predictions about behavior, statistics are sometimes employed to confuse, deceive, or mislead their intended victims. To make matters worse, in the wrong hands statistics can be quite effective in this role. The reason for such success lies in the fact that most of us firmly accept another popular saying: "Numbers don't lie." Thus, when confronted with what appear to be mathematical data and facts, we surrender our usual skepticism and readily accept what we are told. Since the costs of doing so can be quite high, let's conclude this brief discussion of statistics by examining some of the more common—and blatant—*mis*uses of statistics. Here, too, thinking like a psychologist can be of considerable practical

value. If you keep the principles outlined here firmly in mind, you'll often be able to spot such statistical abuses and can avoid being deceived by them.

Random Events Don't Always Seem Random

You pick up the paper and read an account of a young woman who won more than one million dollars at a gambling casino. She placed sixteen bets in a row at a roulette table and won on every spin of the wheel. Why? Was she incredibly lucky? Did she have a system? If you are like many people, you may jump to the conclusion that there is indeed something special about her. After all, how else can this incredible series of events be explained?

If you do jump to such conclusions, you are probably making a serious mistake. Here's why. For any single player, the odds of winning so many times in succession are indeed slight. But consider the vast number of players and the number of occasions on which they play; some casinos remain open around the clock. Also, remember the shape of the normal curve. The mean number of wins in a series of sixteen bets is indeed low—perhaps one or two. But the tails of the curve never level off, so there is some probability, however slight, of even sixteen wins occurring in a row. In short, even events that would be expected to occur by chance very rarely *do* occur. The moral is clear: Don't overinterpret events that seem, at first glance, to border on impossible. They may actually be rare chance occurrences with no special significance of their own.

Large Samples Provide a Better Basis for Reaching Conclusions Than Small Ones

Many television commercials take the following form. A single consumer is asked to compare three unlabeled brands of facial tissue or to compare the whiteness of three loads of wash. She then makes the "right" choice, selecting the sponsor's product as softest, brightest, or whitest. The commercial ends with a statement of the following type: "Here's proof. Our brand is the one most shoppers prefer." Should you take such evidence seriously? I doubt it. In most cases, it is not possible to reach firm statistical conclusions on the basis of the reactions of a single individual, or even of several individuals. Rather, a much larger number of cooperative participants is necessary. After watching such a commercial, then, you should ask what would happen if the same procedures were repeated with 20, 50, or 500 shoppers. Would the sponsor's brand actually be chosen significantly more often than the others? The commercials leave the impression that it would; but, as I'm sure you now realize, jumping to such conclusions is risky. So be skeptical of claims based on very small samples. They are on shaky grounds at best, and they may be designed to be purposely misleading.

Unbiased Samples Provide a Better Basis for Reaching Conclusions Than Biased Ones

Here's another popular type of commercial, and another common misuse of statistics. An announcer, usually dressed in a white coat, states: "Three out of

four dentists surveyed recommend *Jawbreak* sugarless gum." At first glance, the meaning of this message seems clear: Most dentists prefer that their patients chew a specific brand of gum. But look more closely: there's an important catch. Notice that the announcer says, "Three out of four dentists *surveyed. . . .*" Who were these people? A fair and representative sample of all dentists? Major stockholders in the Jawbreak company? Close relatives of the person holding the patent on this product? From the information given, it's impossible to tell. To the extent these or many other possibilities are true, the dentists surveyed represent a *biased* sample; they are *not* representative of the population to which the sponsor wishes us to generalize: all dentists.

So whenever you encounter claims about the results of a survey, ask two questions: (1) Who were the persons surveyed? (2) How were they chosen? If these questions can't be answered to your satisfaction, be on guard: Someone may be trying to mislead you.

Unexpressed Comparisons Are Often Meaningless

Another all-too-common misuse of statistics involves what might be described as "errors of omission." Persons using this tactic mention a comparison but then fail to specify all of the groups or items involved. For example, consider the following statement: "In recent laboratory tests, *Plasti-spred* was found to contain fully 82 percent less cholesterol! So, if you care about your family's health, buy Plasti-spred, the margarine for modern life." Impressive, right? After all, Plasti-spred seems to contain much less of a dangerous substance than—what? There, in fact, is the rub: We have no idea as to the identity of the other substances in the comparison. Were they other brands of margarine? Butter? A jar of bacon drippings? A beaker full of cholesterol?

The lesson offered by such claims is clear. Whenever you are told that a product, candidate, or anything else is better or superior in some way, always ask the following question: Better than *what*?

Some Differences Aren't Really There

Here's yet another type of commercial you've probably seen before. An announcer points to lines on a graph that diverge before your eyes and states, "Here's proof! *Gasaway* neutralizes stomach acid twice as fast as the other leading brand." And in fact, the line labeled Gasaway does seem to rise more quickly, leaving its poor competitor in the dust. Should you take such claims seriously? Again, the answer is no. First, such graphs are usually unlabeled. As a result, we have no idea as to what measure of neutralizing acids or how much time is involved. It is quite possible that the curves illustrate only the first few seconds after the medicine is taken and that beyond that period the advantage for the sponsor's product disappears.

Second, and even more important, there are no grounds for assuming that the differences shown are *significant*—that they could not have occurred by chance. Perhaps there is no difference whatsoever in the speed with which the two products neutralize acid, but the comparison was run over and over again until—by chance—a seemingly large difference in favor of the sponsor's brand occurred. This is not to say that all advertisers, or even most, engage in such practices. Perhaps the differences shown in some commercials are indeed real. Still, given the strong temptation to stress the benefits of one's own product, the following policy is probably best: Assume that all differences reported in ads and similar sources are *not* significant—that is, not real—unless specific information to the contrary is provided.

Graphs May Distort (or At Least Bend) Reality

The results of psychological research are often represented in graphs; graphs can communicate major findings efficiently and can readily present complex relationships that are difficult to describe verbally. Unfortunately, however, graphs are often used for another purpose: to alter the conclusions drawn from a given set of data. There are many ways to do this, but the most common involves altering the meaning of the axes—the horizontal or vertical boundaries of the graph. A specific example may help clarify this process.

Consider how two political candidates, a Democrat and a Republican, might choose to represent the budget deficit in the United States. The Democrat, eager to convince voters that the deficit rose alarmingly under Republican rule, might choose the graph shown on the left in Figure A.6. In contrast, the Republican might prefer to use the graph shown on the right. Notice that in both the same numbers are represented: The deficit rose from $165 billion in 1989 to more than $300 billion in 1991. Yet this rise seems larger and more dramatic in the left-hand graph. As you can readily see, these contrasting patterns are produced by shifts in the size of the units along the vertical axis. These are small in the left-hand graph, but very large in the right-hand one. Would you reach different conclusions about the growth in the deficit if you were exposed to one graph or the other? If you are like most people, the answer is yes, especially if the graph was accompanied by appropriate verbal commentary. For example, Democrat: "The growth in the deficit under Republican rule was nothing short of *alarming!*" Republican: "There was indeed a modest increase in the deficit, but weighed against the economic benefits obtained, this is a small price to pay."

Sadly, such fine-tuning of graphs is common in magazines, political mailings, and many other sources. Thus, it is important to pay careful attention to the scale employed in any graph, the precise quantities being measured, and all labels employed. If you overlook such factors, you may be a sitting duck for those who wish to lead you to false conclusions.

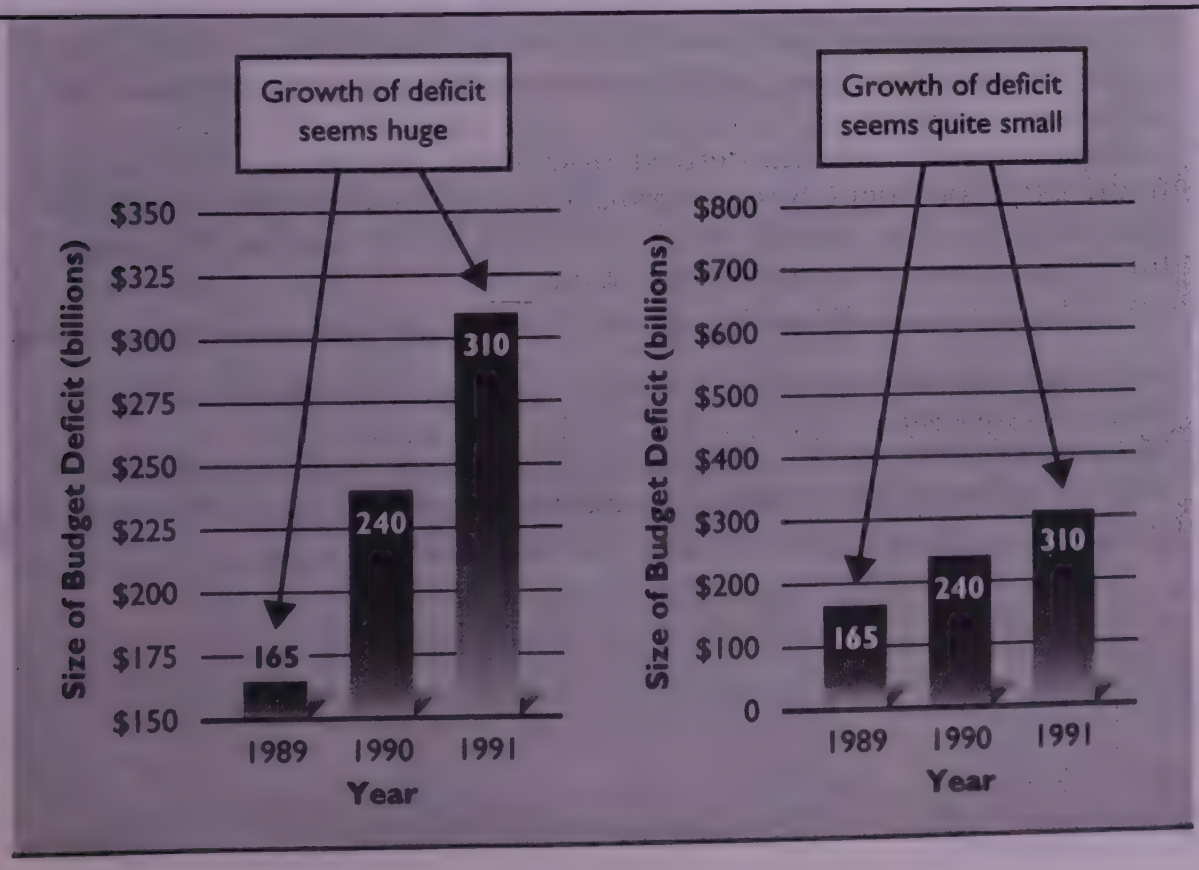


FIGURE A.6

Misleading Graphs: One Common Technique

A change in the scale of the vertical axis can make graphs representing the same data seem to convey very different information. The growth of the budget deficit appears to be huge in the left-hand graph but quite modest in the right-hand graph.

Summary and Review of Key Points

Descriptive Statistics Key Terms: statistics, p. 716 frequency distribution, p. 717 central tendency, p. 717 dispersion, p. 717 descriptive statistics, p. 717 mean, p. 717 mode, p. 717 median, p. 717 range, p. 718 variance, p. 719 standard deviation, p. 719 normal curve, p. 719	• All scientists require two types of tools in their research: equipment for collecting data and some means of interpreting their findings. In psychology statistics are often used for the latter purpose. • Large quantities of data can be grouped into frequency distributions indicating the number of times each score occurs. Two important facts about any frequency distribution are its central tendency—its center—and its dispersion, or the extent to which scores spread out around this value. • Common measures of central tendency include the mean, mode, and median. Dispersion is often measured in terms of variance and the standard deviation. This latter term refers to the average distance of each score from the mean. • The frequency distributions for many behavioral characteristics show a bell-shaped form known as the normal distribution or normal curve. Most scores fall near the middle, and fewer occur at increasing distances from this value. Specific proportions of the scores are found under certain parts of the curve.
Inferential Statistics Key Term: inferential statistics, p. 721	• Psychologists use inferential statistics to determine whether differences between individuals or groups are significant, or real. Inferential statistics assume that the mean difference in question is zero and that observed differences are distributed normally around this value. • If an observed difference is large enough that it would occur by chance only 5 percent of the time, it is viewed as significant.
Correlation and Prediction Key Term: correlation coefficient, p. 723	• To determine whether two or more variables are related, psychologists compute correlation coefficients. These range from –1.00 to +1.00. The larger the departure from 0.00, the stronger the correlation between the variables in question. • Correlations, and statistics derived from them, can be used to predict future behavior from current information. Such predictions are of great practical benefit to schools, companies, and others wishing to predict future performance from current behavior.
Misuse of Statistics	• Although statistics have many beneficial uses, they are often employed to deceive or mislead. • Misuse of statistics can involve the use of extremely small or biased samples, unexpressed comparisons, and misleading graphs and presentations.

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GLOSSARY

Absolute Threshold: The smallest amount of a stimulus that we can detect 50 percent of the time.
Accommodation: In Piaget's theory, the modification of existing mental frameworks to take account of new information.
Achievement Motivation: The desire to accomplish difficult tasks and meet standards of excellence.
Acquired Immune Deficiency Syndrome (AIDS): A fatal viral infection that reduces the immune system's ability to defend itself against the introduction of foreign matter.
Acquisition: The process by which a conditioned stimulus acquires the ability to elicit a conditioned response through repeated pairings of an unconditioned stimulus with the conditioned stimulus.
Action Potential: A rapid shift in the electrical charge across the cell membrane of neurons. This disturbance along the membrane communicates information within neurons.
Acuity: The visual ability to see fine details.
Adaptation: In Piaget's theory of cognitive development, building mental representations of the world through interaction with it.
Adolescence: A period beginning with the onset of puberty and ending when individuals assume adult roles and responsibilities.
Adolescent Invulnerability: Adolescents' belief that they are immune from the potential harm of high-risk behaviors.
Affect: A person's current mood.
Aggression: Behavior directed toward the goal of harming another living being who wishes to avoid such treatment.
Aggressive Motivation: The desire to inflict harm on others.
Agonist: A drug that mimics the action of a neurotransmitter.
Agoraphobia: Fear of losing control and experiencing a panic attack in specific situations, such as in open places, in a crowd, or on an airplane.
Agreeableness: One of the "big five" dimensions of personality; ranges from good-natured, cooperative, trusting at one end to irritable, suspicious, uncooperative at the other.
Algorithm: A rule that guarantees a solution to a specific type of problem.
Alpha Waves: Brain waves that occur when individuals are awake but relaxed.
Alzheimer's Disease: An illness primarily afflicting individuals over the age of sixty-five and involving severe mental deterioration, including retrograde amnesia.
Amnesia: Loss of memory stemming from illness, accident, drug abuse, or other causes.
Amphetamines: Drugs that act as stimulants, increasing feelings of energy and activation.
Anal Stage: In Freud's theory, a psychosexual stage of development in which pleasure is focused primarily on the anal zone.
Analogy: A strategy for solving problems based on applying solutions that were previously successful with other problems similar in underlying structure.
Anchoring-and-Adjustment Heuristic: A cognitive rule of thumb for decision making in which existing information is accepted as a reference point but then adjusted in light of various factors.
Androgynous: High in both femininity and masculinity.
Anima: According to Jung, the archetype representing the feminine side of males.
Animus: According to Jung, the archetype representing the masculine side of females.
Anorexia Nervosa: An eating disorder in which individuals starve themselves and often lose a dangerous amount of weight.
Antagonist: A drug that inhibits the impact of a neurotransmitter.
Anterograde Amnesia: The inability to store in long-term memory information that occurs after an amnesia-inducing event.
Antisocial Personality Disorder: A personality disorder involving a lack of conscience and sense of responsibility, impulsive behavior, irritability, and aggressiveness.
Anxiety: In Freudian theory, unpleasant feelings of tension or worry experienced by individuals in reaction to unacceptable wishes or impulses; increased arousal accompanied by generalized feelings of fear or apprehension.
Anxiety Disorders: Psychological disorders that center on the occurrence of anxiety and include generalized anxiety, phobias, and obsessive-compulsive disorders.
Apnea: Cessation of breathing during sleep.
Archetypes: According to Jung, inherited images in the collective unconscious that shape our perceptions of the external world.
Arousal Theory: A theory of motivation suggesting that human beings seek an optimal level of arousal, not minimal levels of arousal.
Artificial Intelligence: A branch of science that studies the capacity of computers to demonstrate performance that, if it were produced by human beings, would be described as showing intelligence.
Assimilation: In Piaget's theory, the tendency to understand new information in terms of existing mental frameworks.
Attachment: A strong affectional bond between infants and their caregivers.
Attention-Deficit Hyperactivity Disorder: A psychological disorder in which children are unable to concentrate their attention on any task for more than a few minutes.
Attitudes: Mental representations and evaluations of features of the social or physical world.
Attribution: The processes through which we seek to determine the causes behind others' behavior.
Automatic Processing: Processing of information with minimal conscious awareness.
Automatic Vigilance: The strong tendency to pay attention to negative social information.
Autonomic Nervous System: The part of the peripheral nervous system that connects internal organs, glands, and involuntary muscles to the central nervous system.
Availability Heuristic: A cognitive rule of thumb in which the importance or probability of various events is judged on the basis of how readily they come to mind.
Avoidant Attachment: A pattern of attachment in which infants don't cry when their mother leaves them alone during the strange situation test.
Axon Terminals: Structures at the end of axons that contain transmitter substances.
Axons: The parts of the neurons that conduct the action potential away from the cell body.

Babbling: An early stage of speech development in which infants emit virtually all known sounds of human speech.
Backward Conditioning: A type of conditioning in which the presentation of the unconditioned stimulus precedes and does not overlap with the presentation of the conditioned stimulus.

Barbiturates: Drugs that act as depressants, reducing activity in the nervous system and behavior output.
Behavior Therapies: Forms of psychotherapy that focus on changing maladaptive patterns of behavior through the use of basic principles of learning.
Behaviorally Anchored Rating Scales: Performance appraisal scales that provide raters with behavioral examples of various levels of performance (excellent, good, average, and so on).
Behaviorism: The view that psychology should study only observable behavior.
Binocular Cues: Cues to depth or distance provided by the use of both eyes.
Biological Constraints on Learning: Tendencies of some species to acquire some forms of conditioning less readily than other species do.
Biological Rhythms: Cyclic changes in bodily processes.
Biologically Based Therapies: Forms of therapy that attempt to reduce psychological disorders through biological means such as drug therapy or surgery.
Biopsychology: The branch of psychology concerned with discovering the biological bases of our thoughts, feelings, and behaviors.
Bipolar Disorder: A mood disorder involving swings between depression and mania.
Bisexual (sexual orientation): A sexual orientation in which individuals seek sexual relations with members of both their own and the other sex.
Blended Families: Families resulting from remarriage, consisting of biological parents, step-parents, and biological children of one or both spouses.
Blind Spot: The point in the back of the retina through which the optic nerve exits the eye. This exit point contains no rods or cones and is therefore insensitive to light.
Body Language: Nonverbal cues involving body posture or movement of body parts.
Body-Mass Index: A measure of degree of obesity, based on the ratio between height and weight.
Braille Alphabet: Representation of letters by a system of raised dots, used in reading materials for blind persons.
Brightness: The physical intensity of light.
Brightness Constancy: The tendency to perceive objects as having a constant brightness even when they are viewed under different conditions of illumination.
Bulimia: An eating disorder in which periods of binge eating alternate with periods of self-induced purging.
Bystander Effect: A reduced tendency of witnesses to an emergency to help when they believe that there are other potential helpers present.

Cafeteria-Style Benefit Plans: Pay plans that permit employees to choose the specific fringe benefits they prefer.
Cancer: A group of illnesses in which abnormal cells are formed that are able to proliferate, invade, and overwhelm normal tissues and to spread to distant sites in the body.
Cannon-Bard Theory: A theory of emotion suggesting that various emotion-provoking events simultaneously produce subjective reactions labeled as emotions and physiological arousal.
Carcinogens: Cancer-producing agents.
Cardinal Trait: According to Allport, a single trait that dominates an individual's entire personality.
Cardiovascular Disease: All diseases of the heart and blood vessels.
Case Method: A method of research in which detailed information about individuals is used to develop general principles about behavior.
Central Nervous System: The brain and the spinal cord.
Central Route (to persuasion): Attitude change resulting from systematic processing of information contained in persuasive messages.
Central Tendency: The middle (center) of a distribution of scores.
Central Traits: According to Allport, the five or ten traits that best describe an individual's personality.
Cerebellum: A part of the brain concerned with the regulation and coordination of basic motor activities.
Cerebral Cortex: The outer covering of the cerebral hemispheres.
Chaining: A procedure that establishes a sequence of responses, which lead to a reward following the final response in the chain.
Charismatic Leaders: Leaders who exert profound effects on their followers and establish special types of relationships with them.
Childhood: The period between birth and adolescence.
Choking under Pressure: The tendency to perform less well at times when pressures for excellent performance are especially high.
Chromosomes: Threadlike structures containing genetic material, found in nearly every cell of the body.
Chunk: Stimuli perceived as a single unit or a meaningful grouping. Most people can retain seven to nine chunks of information in short-term memory at a given time.
Circadian Rhythms: Cyclic changes in bodily processes occurring within a single day.
Classical Conditioning: A basic form of learning in which one stimulus comes to serve as a signal for the occurrence of a second stimulus. During classical conditioning, organisms acquire information about the relations between various stimuli, not simple associations between them.
Client-Centered Therapy: A form of psychotherapy that concentrates on eliminating irrational conditions of worth—conditions people believe they must meet in order to be loved or accepted.
Climacteric: A period during which the functioning of the reproductive system, and various aspects of sexual activity, change greatly.
Cocaine: A powerful stimulant that produces pleasurable sensations of increased energy and self-confidence.
Cochlea: A portion of the inner ear containing the sensory receptors for sound.
Cognition: The activities involved in thinking, reasoning, decision making, memory, problem solving, and all other forms of higher mental processes.
Cognitive Behavior Therapy: A form of psychotherapy designed to overcome depression by changing self-defeating patterns of thought.
Cognitive Development: Changes in cognitive abilities and functioning occurring as individuals grow older.
Cognitive Dissonance: The state experienced by individuals when they discover inconsistency between two attitudes they hold or between their attitudes and their behavior.
Cognitive Perspective on Persuasion: An approach that seeks to understand persuasion by identifying the cognitive processes that play a role in it.
Cognitive Therapy: Psychotherapy that concentrates on altering faulty or distorted modes of thought so as to alleviate psychological disorders.
Cohort Effects: Differences between persons of different ages stemming from the contrasting social or cultural conditions of the periods in which they grew up.
Collective Unconscious: In Jung's theory, a portion of the unconscious shared by all human beings.

Community Mental Health Centers: Facilities for the delivery of mental health services located in communities where clients live.
Companionate Love: A form of love involving a high degree of commitment and deep concern for the well-being of the beloved.
Compatibility: The degree to which controls operate in a manner consistent with human expectations or tendencies.
Complaining: Expressing discontent or dissatisfaction with oneself or with some aspect of the external world.
Complex Cells: Neurons in the visual cortex that respond to stimuli moving in a particular direction and having a particular orientation.
Compliance: A form of social influence in which one or more persons accepts direct requests from one or more others.
Componential Intelligence: The ability to think analytically.
Computer-Based Work Monitoring: Use of computers to monitor the performance of employees.
Concrete Operations: In Piaget's theory, a stage of cognitive development occurring roughly between the ages of seven and eleven. It is at this stage that children grasp such principles as conservation and the capacity for logical thought emerges.
Concurrent Validity: The relationship between test scores and current performance relative to some criterion.
Conditioned Response (CR): In classical conditioning, the response to the conditioned stimulus.
Conditioned Stimulus (CS): In classical conditioning, the stimulus that is repeatedly paired with an unconditioned stimulus.
Conditioned Taste Aversion: A type of conditioning in which the UCS (usually internal cues associated with nausea or vomiting) occurs several hours after the CS (often a novel food), leading to a strong CS–UCS association in a single trial.
Conditions of Worth: In Rogers's theory, individuals' beliefs that they must meet certain unrealistic conditions in order to be loved or accepted.
Cones: Sensory receptors in the eye that play a crucial role in sensations of color.
Confirmation Bias: The tendency to pay attention primarily to information that confirms existing views or beliefs.
Confluence Theory: A theory suggesting that IQ tends to decrease across the birth order within a family; firstborns tend to have a higher IQ than second-borns, and so on.
Conformity: A type of social influence in which individuals experience pressure to adhere to existing social norms.
Conscientiousness: One of the "big five" dimensions of personality; this dimension ranges from well-organized, careful, responsible at one end to disorganized, careless, unscrupulous at the other.
Consensus: The extent to which behavior by one person is shown by others as well.
Conservation: Principle that states that certain physical attributes of an object remain unchanged even though its outward appearance changes.
Consistency: The extent to which a given person responds in the same way to a given stimulus across time.
Consolidation of Memory: The process of shifting new information from short-term to long-term storage.
Constancies: Our tendency to perceive physical objects as unchanging despite shifts in the pattern of sensations these objects induce.
Construct Validity: The extent to which a test measures a variable or concept described by a psychological theory.
Constructivist Cognitive Therapy: An approach to psychotherapy that seeks to help individuals understand their own unique views of the world, and to change irrational aspects of these views.
Contact Hypothesis: The suggestion that increased contact between members of different social groups will reduce prejudice between them.
Content Validity: The extent to which the items on a test sample the skills or knowledge needed for achievement in a given field or task.
Context-Dependent Memory: The greater ease of recall of information entered into memory in one context or setting in that same context than in others.
Contextual Intelligence: The ability to adapt to a changing environment.
Continuous Reinforcement Schedule: A schedule of reinforcement in which every occurrence of a particular behavior is reinforced.
Control Theory of Self-Consciousness: A theory suggesting that people compare their current behavior and states with important goals and values. They then alter their behavior to close any gaps they observe.
Controlled Processing: Processing of information with relatively high levels of conscious awareness.
Controls: Devices that permit human beings to operate and direct tools, equipment, or systems.
Conventional Level (of morality): According to Kohlberg, a stage of moral development during which individuals judge morality largely in terms of existing social norms or rules.
Convergent Thinking: Thinking that applies existing knowledge and rules of logic so as to zero in on a single correct solution to a problem.
Conversion Disorder: Psychological disorder in which individuals experience real motor or sensory symptoms for which there is no known organic cause.
Cornea: The curved, transparent layer through which light rays enter the eye.
Corpus Callosum: A band of nerve fibers connecting the two hemispheres of the brain.
Correlation Coefficient: A statistic indicating the degree of relationship between two or more variables.
Correlational Method: A research method in which investigators observe two or more variables to determine whether changes in one are accompanied by changes in the other.
Counterfactual Thinking: The tendency to evaluate events by thinking about alternatives to them—"what might have been."
Crack: A cocaine derivative that can be smoked. It acts as a powerful stimulant.
Creativity: Cognitive activity resulting in new or novel ways of viewing or solving problems.
Criterion-Related Validity: A measure of the validity of any psychological test, determined by correlations between scores on the test and some standard of the characteristic the test supposedly assesses.
Critical Thinking: Careful assessment of available evidence in order to evaluate claims and statements in an objective and reasoned manner.
Cross-Sectional Research: Research comparing groups of persons of different ages in order to determine how some aspect of behavior or cognition changes with age.
Cross-Tolerance: Increased tolerance for one drug that develops as a result of taking another drug.
Crystallized Intelligence: Aspects of intelligence that draw on previously learned information to make decisions or solve problems.
Cultural Bias: The tendency of items on a test of intelligence to require specific cultural experience or knowledge.

Dark Adaptation: The process by which the visual system increases its sensitivity to light under low illumination.
Daydreams: Imaginary scenes or events that occur while a person is awake.
Debriefing: In psychological research, the provision of complete and accurate information about a study to participants after they have taken part in it.
Deception: Withholding information about a study from participants. Deception is used in situations where the information that is withheld is likely to alter participants' behavior.
Decision Making: The process of choosing among various courses of action or alternatives.
Deep Structure: Information that underlies the form of a sentence and is crucial to its meaning.
Defense Mechanisms: Techniques used by the ego to keep threatening and unacceptable material out of consciousness and so to reduce anxiety.
Delayed Conditioning: A form of forward conditioning in which the presentation of the conditioned stimulus precedes, but overlaps with, the presentation of the unconditioned stimulus.
Delta Waves: High-amplitude, slow brain waves that occur during several stages of sleep, but especially during Stage 4.
Delusions: Irrational but firmly held beliefs about the world that have no basis in reality.
Demand Characteristics: Implicit pressure on research participants to act in ways consistent with a researcher's expectations.
Dendrites: The parts of neurons that conduct action potentials toward the cell body.
Dependence: Strong physiolgical or psychological need for particular drugs.
Dependent Variable: The aspect of behavior that is measured in an experiment.
Depressants: Drugs that reduce activity in the nervous system and therefore slow many bodily and cognitive processes. Depressants include alcohol and barbiturates.
Depression: A psychological disorder involving intense feelings of sadness, lack of energy, and feelings of hopelessness and despair.
Descriptive Statistics: Statistics that summarize the major characteristics of an array of scores.
Developmental Psychology: The branch of psychology that studies all types of changes occurring throughout the life span.
Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV): The latest version of a manual widely used for diagnosing various psychological disorders.
Diathesis-Stress Model: A model of schizophrenia suggesting that persons with inherited dispositions to develop this disorder do so only when subjected to stressful environmental conditions.
Difference Threshold: The amount of change in a stimulus required before a person can detect the shift.
Diffusion of Responsibility: A sharing of responsibility among all potential helpers who witness an emergency; the result is that each feels less responsible for helping victims.
Discriminative Stimulus: Stimulus that signals the availability of reinforcement if a specific response is made.
Disorganized (or Disoriented) Attachment: A pattern of attachment in which infants show contradictory reactions to their mother after being reunited with her during the strange situation test.
Dispersion: The extent to which scores in a distribution spread out or vary around the center.
Dissociative Amnesia: Amnesia for which there is no organic cause.
Dissociative Disorder: Psychological disorder in which individuals experience profound and lengthy losses of identity or memory.
Dissociative Fugue: Form of dissociative amnesia in which individuals forget their identity and virtually all of their past life.
Dissociative Identity Disorder: Multiple personality disorder, in which a single individual seems to possess more than one personality.
Distinctiveness: The extent to which a given person reacts in the same manner to different stimuli or situations.
Distributional Ratings of Performance: Performance appraisal scales that ask raters to indicate what proportion of the time the performance of the persons being evaluated falls into various categories—excellent, good, and so on.
Divergent Thinking: Thinking that moves outside conventional solutions or knowledge in an effort to develop novel solutions to a problem.
Door-in-the-Face Technique: A technique for gaining compliance in which a large request is followed by a smaller one.
Dopamine Hypothesis: The hypothesis that schizophrenia is associated with excess activity in those parts of the brain in which dopamine is the primary neurotransmitter.
Double-Blind Procedure: Procedure in which neither the persons collecting data nor research participants have knowledge of the experimental conditions to which they have been assigned.
Down Syndrome: A disorder caused by an extra chromosome and characterized by varying degrees of retardation and physical disorders.
Dream: In Levinson's theory of adult development, a vision of future accomplishments.
Dreams: Cognitive events, often vivid but disconnected, that occur during sleep. Most dreams take place during REM sleep.
Dreams of Absent-Minded Transgression: Dreams in which persons attempting to change their own behavior, as in quitting smoking, see themselves unintentionally slipping into the unwanted behavior.
Drive Theory: A theory of motivation suggesting that behavior is "pushed" from within by drives stemming from basic biological needs.
Drug Abuse: Instances in which individuals take drugs purely to change their moods, and in which they experience impaired behavior or social functioning as a result of doing so.
Drug Therapy: Efforts to treat psychological disorders through administration of appropriate drugs.
Drugs: Chemical substances that change the structure or function of biological systems.
Dysfunctional Families: Families that do not meet the needs of children and in fact do them serious harm.

Eating Disorders: Serious disturbances in eating habits or patterns that pose.a threat to individuals' physical health and well-being.
Ego: In Freud's theory, the part of personality that takes rational account of external reality in the expression of instinctive sexual and aggressive urges.
Egocentrism: The inability of young children to distinguish their own perspective from that of others.
Elaboration Likelihood Model (of persuasion): A theory suggesting that there are two distinct routes to persuasion involving different amounts of cognitive elaboration in response to a persuasive message.
Elaborative Rehearsal: Rehearsal in which the meaning of information is considered and the information is related to other knowledge already present in memory.

Electroconvulsive Therapy (ECT): A treatment for depression in which patients receive powerful electric shocks to the head.
Electroencephalogram (EEG): A record of electrical activity within the brain. EEGs play an important role in the scientific study of sleep.
Electroencephalography (EEG): A technique for measuring the electrical activity of the brain via electrodes placed at specified locations on the skull.
Embryo: The developing child during the second through the eighth week of prenatal development.
Emotional Stability: One of the "big five" dimensions of personality; ranges from poised, calm, composed at one end to nervous, anxious, excitable at the other.
Emotions: Reactions consisting of physiological reactions, subjective cognitive states, and expressive behaviors.
Encoding: The process through which information is converted into a form that can be entered into memory.
Encoding Specificity Principle: The fact that only cues encoded at the time information is entered into memory can later contribute to the retrieval of such information.
Encounter Groups: A form of group therapy in which people are urged to tell other group members exactly how they feel; designed to foster personal growth through increased understanding of one's own behavior and increased honesty and openness in personal relations.
Endocrine Glands: Glands that secrete hormones directly into the bloodstream.
Endorphins: Morphine-like substances produced by the body.
Environmental Psychology: The branch of psychology that investigates the effects of the physical environment on human behavior and the effects of that behavior on the environment.
Episodic Memory: Memories of events that we have experienced personally (sometimes termed autobiographical memory).
Equity Theory: A theory suggesting that individuals compare the ratio of their inputs and outcomes in any relationship with the ratios of other persons. If these ratios are not approximately equal, they may experience feelings of inequity, which can reduce work motivation.
Escalation of Commitment: The tendency to become increasingly committed to bad decisions even as losses associated with them increase.
Ethological Theory (of attachment): A theory suggesting that infants are born with a set of behaviors that elicit parental care and so increase the infants' chances of survival.
Evolutionary Psychology: A branch of psychology that studies the adaptive problems humans faced over the course of evolution and the behavioral mechanisms that evolved in response to these environmental pressures.
Expectancy Theory: A theory of motivation suggesting that behavior is elicited by expectations of desirable outcomes.
Expected Utility: The product of the subjective value of an event and its predicted probability of occurrence.
Experiential Intelligence: The ability to formulate new ideas or to combine seemingly unrelated information.
Experimentation: A research method where investigators systematically alter one or more variables in order to determine whether such changes will influence some aspect of behavior.
Experimenter Effects: Unintentional influence exerted by researchers on research participants.
Explicit'(Declarative) Memory: A memory system that permits us to express the information it contains verbally. It includes both semantic and episodic memory.
Externals: In Rotter's terms, individuals who believe that they have little control over the outcomes they experience.
Extinction: The process through which a conditioned stimulus gradually loses the ability to elicit conditioned responses when it is no longer followed by the unconditioned stimulus.
Extrasensory Perception (ESP): Perception without a basis in sensory input.
Extraversion: One of the "big five" dimensions of personality; ranges from sociable, talkative, fun-loving at one end to sober, reserved, cautious at the other.
Extroverts: Individuals who are talkative and sociable, and who often give free rein to their impulses and feelings.
Eyewitness Testimony: Information provided by witnesses to crimes or accidents.

Facial Feedback Hypothesis: A hypothesis indicating that facial expressions can influence as well as reflect emotional states.
False Consensus Effect: The tendency to believe that other persons share our attitudes to a greater extent than is true.
Family Therapy: A form of psychotherapy that focuses on changing interactions or relations among family members.
Fantasies: Imaginary events or scenes that a person experiences while awake.
Farsightedness: A condition in which the visual image of a nearby object is focused behind rather than directly on the retina. Therefore close objects appear out of focus, while distant objects are seen clearly.
Fast Mapping: A process through which children attach a new word to an underlying concept on the basis of a single encounter with it.
Feature Detectors: Neurons at various levels within the visual cortex that respond primarily to stimuli possessing certain features.
Fetus: The developing child during the last seven months of prenatal development.
Figure-Ground Relationship: Our tendency to divide the perceptual world into two distinct parts: discrete figures and the background against which they stand out.
Fixation: Excessive investment of psychic energy in a particular stage of psychosexual development, which results in various types of psychological disorders.
Fixed-Interval Schedule: A schedule of reinforcement in which a specific interval of time must elapse before a response will yield reinforcement.
Fixed-Ratio Schedule: A schedule of reinforcement in which reinforcement occurs only after a fixed number of responses have been emitted.
Flashbulb Memories: Vivid memories of what we were doing at the time of an emotion-provoking event.
Flooding: Procedure for eliminating conditioned fears based on principles of classical conditioning. During flooding an individual is exposed to fear-inducing objects or events. Since no unconditioned stimulus then follows, extinction of fears eventually takes place.
Fluid Intelligence: Aspects of intelligence that involve forming concepts, reasoning, and identifying similarities.
Foot-in-the-Door Technique: A technique for gaining compliance in which a small request is followed by a larger one.
Forced Compliance: A situation in which we feel compelled to say or do things inconsistent with our true attitudes.
Formal Operations: In Piaget's theory, the final stage of cognitive development, during which individuals may acquire the capacity for deductive or propositional reasoning.
Fovea: The area in the center of the retina in which cones are highly concentrated.
Framing: Presentation of information concerning potential outcomes in terms of gains or losses.

Free Association: A key procedure in psychoanalysis in which individuals spontaneously report all thoughts to the therapist.
Frequency Distribution: The frequency with which each score occurs within an entire distribution of scores.
Frequency Theory: A theory of pitch perception suggesting that sounds of different frequencies, heard as differences in pitch, induce different rates of neural activity in the hair cells of the inner ear.
Freudian Slips: Statements that seem to be simple errors in speech, but which in fact reveal unconscious thoughts or impulses.
Frontal Lobe: The portion of the cerebral cortex that lies in front of the central fissure.
Frustration: The blocking of ongoing goal-directed behavior.
Fully Functioning Persons: In Rogers's theory, psychologically healthy persons who enjoy life to the fullest.
Functional Autonomy: In Allport's theory, maintenance of patterns of behavior by motives other than the ones originally responsible for the behavior's occurrence.
Functional Fixedness: The tendency to think of using objects only as they have been used in the past.
Functionalism: An early view of psychology suggesting that psychology should study the ways in which the ever-changing stream of conscious experience helps us adapt to a complex and challenging world.
Fundamental Attribution Error: The tendency to attribute behavior to internal causes to a greater extent than is actually justified.

Gate-Control Theory: A theory suggesting that the spinal cord contains a mechanism that can block transmission of pain signals to the brain.
Gender: An individual's membership in one of the two sexes; all the attributes, behaviors, and expectancies associated with each sex in a given society.
Gender Constancy: Children's understanding that gender is stable over time.
Gender Identity: Children's understanding of the fact that they are male or female.
Gender Roles: Beliefs about how males and females are expected to behave in many situations.
Gender Schema Theory: A theory that children develop a cognitive framework, or schema, reflecting the beliefs of their society concerning the characteristics and roles of males and females; this gender schema then strongly affects the processing of new social information.
General Adaptation Syndrome (GAS): A three-phase model of how organisms respond to stress: (1) alarm or mobilization, (2) resistance, and (3) exhaustion.
Genes: Biological "blueprints" that shape development and all basic bodily processes.
Genetic Linkage Analysis: A procedure used to determine the location of specific genes based on their proximity to known reference points on chromosomes.
Genetic Theories of Aging: Theories suggesting that aging results from genetic programming that regulates the aging process.
Genital Stage: In Freud's theory, the final psychosexual stage of development—one in which individuals acquire the adult capacity to combine lust with affection.
Gestalt Psychologists: German psychologists intrigued by our tendency to perceive sensory patterns as well-organized wholes rather than as separate, isolated parts.
Gestalt Therapy: A form of humanistic psychotherapy designed to increase individuals' awareness and understanding of their own feelings.
Gestures: Movements of various body parts that convey a specific meaning to others.
Glial Cells: Cells in the nervous system that surround, support, and protect neurons.
Goal-Setting Theory: A theory that explains why setting specific, challenging goals for a given task often leads to improvements in performance.
Gonads: The primary sex glands.
Graded Potential: A basic type of signal within neurons that results from external physical stimulation of the dendrite or cell body. Unlike the all-or-nothing nature of action potentials, graded potentials vary in proportion to the size of the stimulus that produced them.
Grammar: Rules within a given language indicating how words can be combined into meaningful sentences.
Great Person Theory of Leadership: A theory suggesting that all great leaders share certain traits.
Group Therapies: Therapies conducted with groups of clients.

Hallucinations: Vivid sensory experiences that occur in the absence of external stimuli yet have the full force of impact of real events or stimuli.
Hallucinogens: Drugs that profoundly alter consciousness, such as marijuana and LSD.
Halo Effects: The tendency to evaluate all traits or aspects of performance by another person in a manner consistent with our overall impression of this person.
Hardiness: A personality style characterized by high levels of commitment, a view of change as an opportunity for growth, and a strong sense of being in control.
Health Belief Model: A model predicting that whether a person practices a particular health behavior depends on the degree to which the person believes in a personal health threat and believes that practicing the behavior will reduce that threat.
Health Psychology: The study of the relation between psychological variables and health; reflects the view that both mind and body are important determinants of health and illness.
Heredity: Biologically inherited characteristics.
Heterosexual (sexual orientation): A sexual orientation in which individuals engage in sexual relations only with members of the other sex.
Heuristics: Mental rules of thumb that permit us to make decisions and judgments in a rapid and efficient manner.
Hierarchy of Needs: In Maslow's theory of motivation, an arrangement of needs from the most basic to those at the highest levels.
Hindsight Effect: The tendency to assume that we would have been better at predicting actual events than is really true.
Homeostasis: A state of physiological balance within the body.
Homosexual (sexual orientation): A sexual orientation in which individuals prefer sexual relations with members of their own sex.
Hormones: Substances secreted by endocrine glands that regulate a wide range of bodily processes.
Hue: The color that we experience due to the dominant wavelength of a light.
Human Factors: The branch of psychology that applies basic knowledge about human abilities and limitations to the design of tools, equipment, systems, and products.
Humanistic Perspective: A perspective in modern psychology suggesting that human beings have free will and are not simply under the control of various internal and external factors.

Humanistic Theories: Theories of personality emphasizing personal responsibility and innate tendencies towards personal growth.
Humanistic Therapies: Forms of psychotherapy based on the assumption that psychological disorders stem from environmental conditions that block normal growth and development.
Hunger Motivation: The motivation to obtain and consume food.
Huntington's Disease: A genetically based fatal neuromuscular disorder characterized by the gradual onset of jerky, uncontrollable movements.
Hypercomplex Cells: Neurons in the visual cortex that respond to complex aspects of visual stimuli, such as width, length, and shape.
Hypersomnias: Disorders involving excessive amounts of sleep or an overwhelming urge to fall asleep.
Hypertension: High blood pressure, a condition in which the pressure within the blood vessels is abnormally high.
Hypnosis: An interaction between two persons in which one (the hypnotist) induces changes in the behavior, feelings, or cognitions of the other (the subject) through suggestions. Hypnosis involves subjects' expectations and their attempts to conform to the role of the hypnotized person.
Hypochondriasis: A psychological disorder in which individuals convert anxiety into chronic preoccupations with their health and bodily functions.
Hypothalamus: A small structure deep within the brain that plays a key role in the regulation of the autonomic nervous system and of several forms of motivated behavior such as eating and aggression.
Hypothesis: In psychology, a prediction about behavior that is to be investigated in a research project.
Hypothetico-Deductive Reasoning: In Piaget's theory, a type of reasoning first shown during the stage of formal operations. It involves formulating a general theory and deducing specific hypotheses from it.

Id: In Freud's theory, the portion of personality concerned with immediate gratification of primitive needs.
Illusions: Instances in which perception yields false interpretations of physical reality.
Implicit Memory: A memory system that stores information that we cannot express verbally; sometimes termed procedural memory.
Impression Management: Efforts by individuals to enhance the impression they make on others.
Incentives: Rewards individuals seek to attain.
Independent Variable: The variable that is systematically altered in an experiment.
Individual Differences: Differences between individuals that distinguish them from one another.
Industrial/Organizational Psychology: The branch of psychology that studies all aspects of behavior in work settings and the nature of work settings themselves.
Infantile Amnesia: Inability to remember the first two or three years of life, probably because we did not possess a well-developed self-concept during that period.
Inferential Statistics: Statistical procedures that provide information on the probability that an observed event is due to chance and that permit us to determine whether differences between individuals or groups are ones that are likely or unlikely to have occurred by chance.
Information-Processing Approach: An approach to understanding human memory that emphasizes the encoding, storage, and later retrieval of information.
Informed Consent: Participants' agreement to take part in a research project after they are provided with information about the nature of such participation.
Ingratiation: A technique of social influence based on inducing increased liking in the target person before influence is attempted.
Insomnia: Disorder involving the inability to fall asleep or remain asleep.
Instinct Theory: A theory of motivation suggesting that many forms of behavior stem from innate urges or tendencies.
Instincts: Patterns of behavior assumed to be universal in a species.
Intelligence: The ability to think abstractly and to learn readily from experience.
Internals: In Rotter's terms, individuals who believe that they exert considerable control over the outcomes they experience.
Interpersonal Attraction: The extent to which we like or dislike other persons.
Intrinsic Motivation: The desire to perform activities because they are rewarding in and of themselves.
Introverts: Individuals who are quiet, cautious, and reclusive, and who generally inhibit expression of their impulses and feelings.
IQ: A numerical value that reflects the extent to which an individual's score on an intelligence test departs from the average for other people of the same age.
Iris: The colored part of the eye that adjusts the amount of light that enters by constricting or dilating the pupil.

James-Lange Theory: A theory of emotion suggesting that emotion-provoking events produce various physiological reactions and that recognition of these is responsible for subjective emotional experiences.
Job Design: Efforts to make jobs more motivating to the persons who hold them by making them more interesting and appealing.
Job Enlargement: Adding more varied tasks, at the same level of responsibility or skill, to a given job.
Job Enrichment: Expanding a given job to include additional tasks at higher levels of skill or responsibility.
Job Satisfaction: Individuals' positive or negative attitudes toward their jobs.
Just Noticeable Difference (jnd): The smallest amount of change in a physical stimulus necessary for an individual to notice a difference in the intensity of the stimulus.

Kinesthesia: The sense that gives us information about the location of our body parts with respect to each other and allows us to perform movements.
Korsakoff's Syndrome: An illness caused by long-term abuse of alcohol that often involves profound retrograde amnesia.

Language: A system of symbols, plus rules for combining them, used to communicate information.
Late-Adult Transition: In Levinson's theory of adult development, a transition in which individuals must come to terms with their impending retirement.
Latency Stage: In Freud's theory, the psychosexual stage of development that follows resolution of the Oedipus complex. During this stage, sexual desires are relatively weak.
Latent Content: In Freud's theory, the hidden content of dreams.
Lateralization of Function: Specialization of the two hemispheres of the brain for the performance of different functions.
Laws of Grouping: Simple principles describing how we

tend to group discrete stimuli together in the perceptual world.
Leadership: The process through which one member of a group (its leader) exerts influence over other group members with respect to the attainment of shared group goals.
Learned Helplessness: Feelings of helplessness that develop after exposure to situations in which nothing individuals do affects their outcomes. Learned helplessness appears to play a role in the occurrence of depression.
Learning: Any relatively permanent change in behavior (or behavior potential) resulting from experience.
Leniency Effects: Tendencies to assign higher ratings to persons being evaluated than they actually deserve.
Lens: A curved structure behind the pupil that bends light rays, focusing them on the retina.
Less-Leads-to-More Effect: The fact that rewards just barely sufficient to induce individuals to state positions contrary to their own views often generate more attitude change than larger rewards.
Levels of Processing View: A view of memory suggesting that the greater the effort expended in processing information, the more readily it will be recalled at later times.
Libido: According to Freud, the psychic energy that powers all mental activity.
Life Structure: In Levinson's theory of adult development, the underlying pattern or design of a person's life.
Lifestyle: In the context of health psychology, the overall pattern of decisions and behaviors that determine health and quality of life.
Limbic System: Several structures deep within the brain that play a role in emotional reactions and behavior.
Linguistic Relativity Hypothesis: The view that language shapes thought.
Localization: The ability of our auditory system to determine the direction of a sound source.
Longitudinal Research: Research in which the same individuals are studied across relatively substantial periods of time, such as years.
Longitudinal-Sequential Design: A research approach in which several groups of individuals of different ages are studied across time.
Long-Term Memory: A memory system for the retention of large amounts of information over long periods of time.
Love: A strong emotional state involving attraction, sexual desire, and concern for another person.
LSD: A powerful hallucinogen that produces profound shifts in perception; many of these are frightening in nature.

Magnetic Resonance Imaging (MRI): A method for studying the intact brain in which images are obtained by exposure of the brain to a strong magnetic field.
Make-Believe Play: Play in which children pretend to be engaging in various familiar activities, such as eating or going to sleep.
Manifest Content: In Freud's theory, the overt or reported content of dreams.
Marital Therapy: Psychotherapy that attempts to improve relations and understanding in couples.
Matching Hypothesis: The hypothesis that individuals seek romantic partners whose assets are at least equal to their own level of desirability.
Mathematics Anxiety: Fear on the part of individuals that they cannot master the concepts or operations of mathematics.
Mean: A measure of central tendency derived by adding all scores and dividing by the number of scores.
Means-Ends Analysis: A technique for solving problems in which the overall problem is divided into parts and efforts are made to solve each part in turn.
Median: A measure of central tendency indicating the midpoint of an array of scores.
Medical Perspective: The view that psychological disorders have a biological basis and should be viewed as treatable diseases.
Medulla: A brain structure concerned with the regulation of vital bodily functions such as breathing and heartbeat.
Memory: The capacity to retain and later retrieve information.
Menopause: Cessation of the menstrual cycle.
Mental Retardation: Intellectual functioning that is considerably below average.
Mental Set: The impact of past experience on present problem solving; specifically, the tendency to retain methods that were successful in the past even if better alternatives now exist.
Mentor: In Levinson's theory of adult development, an older and more experienced individual who helps to guide younger adults.
Meta-Analysis: Statistical procedures for combining the results of many studies in order to determine whether their findings provide support for specific hypotheses.
Metacognition: Awareness and understanding of our own cognitive processes.
Midbrain: A part of the brain containing primitive centers for vision and hearing. It also plays a role in the regulation of visual reflexes.
Midlife Transition: In Levinson's theory of adult development, a turbulent transitional period occurring between the ages of forty and forty-five.
Mitosis: Cell division in which chromosome pairs split and then replicate themselves so that the full number is restored in each of the cells produced by division.
Mode: A measure of central tendency indicating the most frequent score in an array of scores.
Modeling: A basic learning process in which individuals acquire new behaviors by observing others and then put these into action.
Monocular Cues: Cues to depth or distance provided by one eye.
Mood Disorders: Psychological disorders involving intense and prolonged mood shifts.
Moral Development: Changes in the capacity to reason about actions' rightness or wrongness that occur with age.
Morphemes: The smallest units of speech that convey meaning.
Motivated Skepticism: The tendency to require more information to make a decision contrary to one's initial preferences than a decision consistent with one's initial preferences.
Motivation: An inferred internal process that activates, guides, and maintains behavior over time.
Multicultural Perspective: In modern psychology, a perspective that takes note of the fact that many aspects of behavior are strongly influenced by factors related to culture and ethnic identity.

Narcolepsy: A sleep disorder in which individuals are overcome by uncontrollable periods of sleep during waking hours.
Naturalistic Observation: A research method in which various aspects of behavior are carefully observed in the settings where such behavior naturally occurs.
Nearsightedness: A condition in which the visual image of a distant object is focused slightly in front of the retina rather than directly on it. Therefore distant objects appear fuzzy or blurred, whereas near objects can be seen clearly.

Negative Afterimage: A sensation of complementary color that we experience after staring at a stimulus of a given hue.
Negative Reinforcers: Stimuli that strengthen responses that permit an organism to avoid or escape from their presence.
Neodissociation Theory: A theory of hypnosis suggesting that hypnotized individuals enter an altered state of consciousness in which consciousness is divided.
Neo-Freudians: Personality theorists who accepted basic portions of Freud's theory but rejected or modified other portions.
Nervous System: The complex structure that regulates bodily processes and is responsible, ultimately, for all aspects of conscious experience.
Neural Networks: Computer systems modeled after the brain and made up of highly interconnected elementary computational units that work together in parallel.
Neurons: Cells specialized for communicating information, the basic building blocks of the nervous system.
Neurotransmitters: Chemicals, released by neurons, that carry information across the synapse.
Nicotine: The addictive substance in tobacco.
Night Terrors: Extremely frightening dreamlike experiences that occur during non-REM sleep.
Nodes of Ranvier: Small gaps in the myelin sheath surrounding the axons of many neurons.
Nonverbal Cues: Outward signs of others' emotional states. Such cues involve facial expressions, eye contact, and body language.
Normal Curve: A symmetrical, bell-shaped frequency distribution. Most scores are found near the middle, and fewer and fewer occur toward the extremes. Many psychological characteristics are distributed in this manner.
Normative Theory: A theory suggesting that to maximize their effectiveness, leaders must adopt a decision-making approach or style consistent with the situation they face.

Obedience: A form of social influence in which one individual issues orders to another to behave in a specific way.
Obesity: The state of being significantly overweight.
Object Permanence: An understanding of the fact that objects continue to exist when they pass from view.
Observational Learning: The acquisition of new information, concepts, or forms of behavior through exposure to others and the consequences they experience.
Obsessive-Compulsive Disorder: Anxiety disorder in which an individual is unable to stop thinking the same thoughts or performing the same ritualistic behaviors.
Occipital Lobe: A portion of the cerebral cortex involved in vision.
Oedipus Complex: In Freud's theory, a crisis of psychosexual development in which children must give up their sexual attraction to their opposite-sex parent.
Omission Training: A procedure in which a response is weakened through the removal of a desired object or activity.
Openness to Experience: One of the "big five" dimensions of personality; ranges from imaginative, sensitive, intellectual at one end to down-to-earth, insensitive, crude at the other.
Operant Conditioning: A process through which organisms learn to repeat behaviors that yield positive outcomes or permit them to avoid or escape from negative outcomes.
Opiates: Drugs that induce a dreamy, relaxed state and, in some persons, intense feelings of pleasure. Opiates exert their effects by stimulating special receptor sites within the brain.
Opponent-Process Theory: A theory that describes the processing of sensory information related to color at levels above the retina. The theory suggests that we possess six types of neurons, each of which is either stimulated or inhibited by red, green, blue, yellow, black, or white.
Opponent-Process Theory of Emotion: A theory suggesting that an emotional reaction to a stimulus is followed automatically by an opposite reaction.
Optic Nerve: A bundle of nerve fibers that exit the back of the eye and carry visual information to the brain.
Oral Stage: In Freud's theory, a stage of psychosexual development during which pleasure is centered in the region of the mouth.
Organizational Citizenship Behavior: Actions performed by individuals that are not part of their regular job but contribute to the success of the organization.
Oversight Bias: The tendency to overlook flaws if the overall topic or issue is perceived as important.

Panic Attack Disorder: Anxiety disorder characterized by relatively brief periods during which individuals experience unbearably intense anxiety.
Parallel Distributed Processing Model: A model suggesting that our memory systems process information in several different ways simultaneously.
Paranoid Personality Disorder: A personality disorder in which individuals feel that others are out to get them and cannot be trusted.
Paraphilias: Sexual disorders involving choices of inappropriate sexual objects, such as young children, or the inability to experience arousal except in the presence of specific objects or fantasies.
Parapsychologists: Individuals who study psi and other paranormal events.
Parasympathetic Nervous System: The portion of the autonomic nervous system that readies the body for restoration of energy.
Parental Investment Model: The view that males and females adopt contrasting strategies of mate selection because they invest different amounts of resources in their offspring.
Parietal Lobe: A portion of the cerebral cortex, lying behind the central fissure, that plays a major role in the skin senses: touch, temperature, pressure.
Passive Smoking: Inhaling other people's cigarette smoke.
Peak Experiences: In Maslow's theory, intense emotional experiences during which individuals feel at one with the universe.
Perception: The process through which we select, organize, and interpret input from our sensory receptors.
Performance Appraisals: Annual or semiannual evaluations of employees' performance coupled with feedback about the ratings they have received.
Peripheral Nervous System: The portion of the nervous system that connects internal organs and glands, as well as voluntary and involuntary muscles, to the central nervous system.
Peripheral Route (to persuasion): Attitude change resulting from peripheral persuasion cues—information concerning the expertise, status, or attractiveness of would-be persuaders.
Person-Environment (P-E) Fit: The approach that suggests that a misfit between a person and his or her work environment may produce stress.
Personality: Individuals' unique and relatively stable patterns of behavior, thoughts, and feelings.
Personality Disorders: Extreme personality variation associated with the failure to achieve the universal tasks of establishing a personal identity, forming attachments to others, experiencing intimacy with them, and seeking affiliation.
Personality Traits: Specific dimensions along which individuals' personalities differ in consistent, stable ways.

Persuasion: The process through which one or more persons attempt to alter the attitudes of one or more others.
Phallic Stage: In Freud's theory, a psychosexual stage of development during which pleasure is centered in the genital region. It is during this stage that the Oedipus complex develops.
Phenylketonuria (PKU): A genetically based disorder in which a person lacks the enzyme to break down phenylalanine, a substance present in many foods. The gradual buildup of phenylalanine contributes to subsequent outcomes that include retardation.
Phobias: Intense, irrational fears of objects or events.
Phonemes: A set of sounds basic to a given language.
Phonological Development: Development of the ability to produce recognizable speech.
Phonological Strategies: Simplifications used by young children to facilitate the task of producing recognizable speech.
Physical Growth and Development: Physical changes in the size and structure of our bodies between conception and adulthood.
Physiological Dependence: Strong urges to continue using a drug based on organic factors such as changes in metabolism.
Pinna: The external portion of the ear.
Pitch: The characteristic of a sound that is described as high or low. Pitch is mediated by the frequency of a sound.
Pituitary Gland: An endocrine gland that releases hormones to regulate other glands and several basic biological processes.
Place Theory: A theory suggesting that sounds of different frequency stimulate different areas of the basilar membrane.
Placenta: A structure that surrounds, protects, and nourishes the developing fetus.
Pleasure Principle: The principle on which the id operates—immediate pleasure with no attention to possible consequences.
Pons: A portion of the brain through which sensory and motor information passes and which contains structures relating to sleep, arousal, and the regulation of muscle tone and cardiac reflexes.
Positive Reinforcers: Stimuli that strengthen responses that precede them.
Positron Emission Tomography (PET): An imaging technique that detects the activity of the brain by measuring glucose utilization or blood flow.
Postconventional Level (of morality): According to Kohlberg, the final stage of moral development, in which individuals judge morality in terms of abstract principles.
Posttraumatic Stress Disorder: Psychological disorder resulting from a very stressful experience; includes nightmares and flashbacks, distress at exposure to reminders of the event, irritability, difficulty concentrating, and a general unresponsiveness.
Power Motivation: Motivation to be in charge, have high status, and exert influence over others.
Preconventional Level (of morality): According to Kohlberg, the earliest stage of moral development, in which individuals judge morality in terms of the effects produced by various actions.
Predictive Validity: The relationship between scores on a test and later performance relative to a criterion.
Prejudice: Negative attitudes toward the members of some social group based on their membership in this group.
Premack Principle: The principle that a more preferred activity can be used to reinforce a less preferred activity.
Preoperational Stage: In Piaget's theory, a stage of cognitive development during which children become capable of mental representations of the external world.
Prevention Strategies: Techniques designed to reduce the occurrence of physical and psychological problems.
Primary Aging: Aging due to the passage of time and, to some extent, inherited biological factors.
Primary Prevention: Techniques aimed at preventing the occurrence of psychological disorders.
Private Speech: The instructions about what to do next that young children often give themselves as they perform various activities.
Proactive Interference: Interference with the learning or storage of current information by information previously entered into memory.
Problem Solving: Efforts to develop or choose among various responses in order to attain desired goals.
Procedural Memory: A memory system that retains information we cannot readily express verbally—for example, information necessary to perform skilled motor activities such as riding a bicycle.
Propinquity: Physical proximity and the interpersonal contact it produces.
Propositional Reasoning: In Piaget's theory, reasoning during the stage of formal operations, in which individuals can assess the validity of verbal assertions even when these refer to possibilities rather than to actual events.
Propositions: Sentences that relate one concept to another and can stand as separate assertions.
Prosocial Behavior: Actions that benefit others without necessarily providing any direct benefit to the persons who perform them.
Prosopagnosia: A rare condition in which brain damage impairs a person's ability to recognize faces.
Prospective Memory: Remembering to perform certain activities at specific times.
Prototypes: Representations in memory of various objects or stimuli in the physical world; the best or clearest examples of various objects or stimuli in the physical world.
Psi: Unusual processes of information or energy transfer that are currently unexplained in terms of known physical or biological mechanisms. Included under the heading of psi are such supposed abilities as telepathy (reading others' thoughts) and clairvoyance (perceiving unseen objects or unknowable events).
Psychedelics: Drugs that alter sensory perception and so may be considered mind-expanding.
Psychiatry: A branch of medicine that focuses on the diagnosis and treatment of psychological disorders.
Psychoanalysis: A method of therapy based on Freud's theory of personality, in which the therapist attempts to bring repressed unconscious material into consciousness.
Psychodrama: A form of psychodynamic group therapy in which people act out their problems in front of fellow group members.
Psychodynamic Perspective: An approach suggesting that many aspects of behavior stem from hidden forces within our personalities.
Psychodynamic Therapies: Therapies based on the assumption that psychological disorders stem primarily from hidden inner conflicts with repressed urges and impulses.
Psychological Dependence: Strong desires to continue using a drug even though it is not physiologically addicting.
Psychological Disorders: Behaviors or thoughts that are unusual in a given society, that are maladaptive, and that cause the persons who experience them considerable distress.
Psychology: The science of behavior and cognitive processes.
Psychosexual Stages of Development: According to Freud, an innate sequence of stages through which all human beings

pass. At each stage, pleasure is focused on a different region of the body.
Psychosurgery: Efforts to alleviate psychological disorders by surgical means.
Psychotherapies: Procedures designed to eliminate or modify psychological disorders through the establishment of a special relationship between a client and a trained therapist.
Puberty: The period of rapid change during which individuals reach sexual maturity and become capable of reproduction.
Punishment: The application or removal of a stimulus so as to decrease the strength of a behavior.
Pupil: An opening in the eye, just behind the cornea, through which light rays enter the eye.

Racial Identification: The extent to which individuals identify with their own racial group.
Random Assignment of Participants to Experimental Conditions: Assuring that all research participants have an equal chance of being assigned to each of the experimental conditions.
Range: The difference between the highest and lowest scores in a distribution of scores.
Rational-Emotive Therapy: A cognitive therapy that focuses on changing irrational beliefs.
Raven Progressive Matrices: One popular "culture-fair" test of intelligence.
Reaction Formation: A defense mechanism in which people act in a manner directly opposite to their unconscious wishes.
Realistic Conflict Theory: A theory proposing that prejudice stems, at least in part, from economic competition between social groups.
Reality Principle: The principle on which the ego operates, according to which the external consequences of behavior are considered in the regulation of expression of impulses from the id.
Reasoning: Cognitive activity that transforms information in order to reach specific conclusions.
Recategorization: Shifting the boundary between "us" and "them" so that persons previously seen as belonging to outgroups are now seen as belonging to the ingroup.
Reconditioning: The rapid recovery of a conditioned response to a CS–UCS pairing following extinction.
Reinforcement: The application or removal of a stimulus so as to increase the strength of a behavior.
Relative Size: A visual cue based on comparison of the size of an unknown object to one of known size.
REM Sleep: A state of sleep in which brain activity resembling waking restfulness is accompanied by deep muscle relaxation and movements of the eyes. Most dreams occur during periods of REM sleep.
Repeated Exposure Effect: The fact that the more frequently we are exposed to various stimuli (at least up to a point), the more we tend to like them.
Representativeness Heuristic: A mental rule of thumb suggesting that the more closely an event or object resembles typical examples of some concept or category, the more likely it is to belong to that concept or category.
Repression: A theory of forgetting that suggests that memories of experiences or events we find threatening are sometimes pushed out of consciousness so that they can no longer be recalled.
Resistance: Efforts by individuals undergoing psychoanalysis to prevent repressed impulses or conflicts from entering consciousness.
Resistant Attachment: A pattern of attachment in which infants reject their mother and refuse to be comforted by her after she leaves them alone during the strange situation test.
Reticular Activating System: A structure within the brain concerned with sleep, arousal, and the regulation of muscle tone and cardiac reflexes.
Retina: The surface at the back of the eye containing the rods and cones.
Retrieval: The process through which information stored in memory is located.
Retrieval Cues: Stimuli associated with information stored in memory that can aid in its retrieval.
Retroactive Interference: Interference with retention of information already present in memory by new information being entered into memory.
Retrograde Amnesia: The inability to store in long-term memory information that occurred before an amnesia-inducing event.
Risk Factors: Aspects of our environment or behavior that influence our chances of developing or contracting a disease, within the limits set by our genetic structure.
Rods: One of the two types of sensory receptors for vision found in the eye.
Romantic Love: A form of love in which feelings of strong attraction and sexual desire toward another person are dominant.

Saccadic Movements: Quick movements of the eyes from one point of fixation to another.
Saturation: The degree of concentration of the hue of light. We experience saturation as the purity of a color.
Schachter-Singer Theory (two-factor theory): A theory of emotion suggesting that our subjective emotional states are determined, at least in part, by the cognitive labels we attach to feelings of arousal.
Schedules of Reinforcement: Rules determining when and how reinforcements will be delivered.
Schemas: Cognitive frameworks representing our knowledge about aspects of the world.
Schizoid Personality Disorder: A personality disorder in which individuals become almost totally detached from the social world.
Schizophrenia: A group of serious psychological disorders characterized by severe distortions in thought and language, perceptions, and emotion.
Script: Mental representation of the sequence of events in a given situation.
Seasonal Affective Disorder (SAD): Depression experienced during the winter months, supposedly stemming from a lack of exposure to sunlight.
Secondary Aging: Aging due to the effects of disease, disuse, or abuse of the body.
Secondary Prevention: Techniques that focus on early detection of psychological disorders so that minor disturbances will not develop into major ones.
Secondary Traits: According to Allport, traits that exert relatively specific and weak effects upon behavior.
Secure Attachment: A pattern of attachment in which infants actively seek contact with their mother and take comfort from her presence when they are reunited with her during the strange situation test.
Selective Attention: Our ability to pay attention to only some aspects of the world around us while largely ignoring others.
Self-Actualization: A stage of personal development in which individuals reach their maximum potential.
Self-Concept: All the information and beliefs individuals have about their own characteristics and themselves.

Self-Consciousness: Increased awareness of oneself as a social object or of one's own values and attitudes.
Self-Disclosure: The act of revealing information about oneself to another person.
Self-Efficacy: Individuals' expectations concerning their ability to perform various tasks.
Self-Esteem: The extent to which individuals have positive or negative feelings about themselves and their own worth.
Self-Help Groups: Groups of individuals experiencing the same kinds of difficulties that meet to discuss their shared problem and find solutions to it.
Self-Monitoring: A personality trait involving sensitivity to social situations and an ability to adapt one's behavior to the demands of those situations in order to make favorable impressions on others.
Self-Reinforcement: The delivery of rewards to oneself for reaching one's self-set goals.
Self-Schemas: Cognitive frameworks that serve to organize information about the self.
Self-Serving Bias: The tendency to attribute positive outcomes to our own traits or characteristics but negative outcomes to factors beyond our control.
Semantic Development: Development of understanding of the meaning of spoken or written language.
Semantic Memory: The content of our general, abstract knowledge about the world.
Semicircular Canals: Fluid-filled structures that provide information about rotational acceleration of the head or body around three principal axes of rotation.
Sensation: Input about the physical world provided by our sensory receptors.
Sensation Seeking: A trait relating to the extent to which individuals seek and enjoy high levels of stimulation.
Sensitivity-Training Groups: A form of group therapy designed to foster personal growth through increased understanding of one's own behavior and increased honesty and openness in personal relations.
Sensorimotor Stage: In Piaget's theory, the earliest stage of cognitive development.
Sensory Adaptation: Reduced sensitivity to unchanging stimuli over time.
Sensory Memory: A memory system that retains representations of sensory input for brief periods of time.
Sensory Receptors: Cells specialized for the task of transduction—converting physical energy (light, sound) into neural impulses.
Serial Position Curve: The greater accuracy of recall of words or other information early and late in a list than words or information in the middle of the list.
Serum Cholesterol: The amount of cholesterol in one's blood.
Sex-Stereotyped Behavior: Patterns of behavior associated by society with each sex.
Sexual Abuse: Sexual contact or activities forced on children or adolescents by other persons, usually adults.
Sexual Arousal Disorders: Psychological disorders involving inability to attain an erection (males) or absence of vaginal swelling and lubrication (females).
Sexual Desire Disorders: Psychological disorders involving a lack of interest in sex or active aversion to sexual activities.
Sexual Jealousy: A negative state aroused by a perceived threat to one's sexual relationship with another person.
Sexual Motivation: Motivation to engage in various forms of sexual activity.
Shape Constancy: The tendency to perceive a physical object as having a constant shape even when the image it casts on the retina changes.
Shaping: A technique in which closer and closer approximations of desired behavior are required for the delivery of positive reinforcement.
Short-Term Memory: A memory system that holds limited amounts of information for relatively short periods of time.
Signal Detection Theory: A theory suggesting that there are no absolute thresholds for sensations. Rather, detection of stimuli depends on their physical energy and on internal factors such as the relative costs and benefits associated with detecting their presence.
Simple Cells: Cells within the visual system that respond to specific shapes presented in certain orientations (horizontal, vertical, etc.).
Simultaneous Conditioning: A form of conditioning in which the conditioned stimulus and the unconditioned stimulus begin and end at the same time.
Situational Leadership Theory: A theory of leadership indicating that as their followers gain increasing experience, leaders should shift from a directive to a nondirective style of leadership.
Size Constancy: The tendency to perceive a physical object as having a constant size even when the size of the image it casts on the retina changes.
Sleep: A process in which important physiological changes (including shifts in brain activity and slowing of basic bodily functions) are accompanied by major shifts in consciousness.
Social and Emotional Development: Changes in emotional experiences and expressions, and in behaviors and attitudes toward others, occurring with age.
Social Categorization: Our tendency to divide the social world into two distinct categories: "us" and "them."
Social Cognition: The processes through which we notice, interpret, remember, and later use social information.
Social Cognitive Theory: A theory of behavior suggesting that human behavior is influenced by many cognitive factors as well as by reinforcement contingencies, and that human beings have an impressive capacity to regulate their own actions.
Social Facilitation: Effects on behavior stemming from the mere presence of others.
Social Influence: Efforts by one or more individuals to change the attitudes or behavior of one or more others.
Social Norms: Rules in a given group or society indicating how individuals ought to behave in specific situations.
Social Psychology: The branch of psychology that studies all aspects of social behavior and social thought.
Social Referencing: Using others' reactions to appraise an uncertain situation or experience.
Somatic Nervous System: The portion of the peripheral nervous system that connects the brain and spinal cord to voluntary muscles.
Somatization Disorder: A psychological condition in which individuals report physical complaints and symptoms, including aches and pains, problems with their digestive systems, and sexual problems such as sexual indifference or irregular menstruation.
Somatoform Disorders: Category of disorders in which psychological conflicts or other problems take on a physical form.
Somnambulism: A sleep disorder in which individuals actually get up and move about while still asleep.
Source Traits: According to Cattell, key dimensions of personality that underlie many other traits.
Split-Half Reliability: The extent to which an individual attains equivalent scores on two halves of a psychological test.
Spontaneous Recovery: Following extinction, return of a conditioned response upon reinstatement of CS–UCS pairings.

SQUID (Superconducting Quantum Interference Device): An imaging device that captures images of the brain through its ability to detect tiny changes in magnetic fields in the brain.
Stage Theory: Any theory proposing that all human beings move through an orderly and predictable series of changes.
Standard Deviation: A measure of dispersion reflecting the average distance between each score and the mean.
Stanford-Binet Test: A popular test for measuring individual intelligence.
State-Dependent Retrieval: Retrieval of information stored in long-term memory cued by aspects of one's physical state.
States of Consciousness: Varying degrees of awareness of ourselves and the external world.
Statistics: Mathematical procedures used to describe data and draw inferences from them.
Stereotypes: Cognitive frameworks suggesting that all members of specific social groups share certain characteristics.
Stimulants: Drugs that increase activity in the nervous system, including amphetamines, caffeine, and nicotine.
Stimulus: A physical event capable of affecting behavior.
Stimulus Control: Consistent occurrence of a behavior in the presence of a discriminative stimulus.
Stimulus Discrimination: The process by which organisms learn to respond to certain stimuli but not to others.
Stimulus Generalization: The tendency of stimuli similar to a conditioned stimulus to elicit a conditioned response.
Storage: The process through which information is retained in memory.
Strange Situation Test: A procedure for studying attachment in which mothers leave their children alone with a stranger for several minutes and then return.
Stress: The process that occurs in response to events that disrupt, or threaten to disrupt, our physical or psychological functioning.
Stressors: Events or situations in our environment that cause stress.
Striving for Superiority: Attempting to overcome feelings of inferiority. According to Adler, this is the primary motive for human behavior.
Structuralism: An early view suggesting that psychology should focus on conscious experience and on the task of analyzing such experience into its basic parts.
Sublimation: A defense mechanism in which threatening unconscious impulses are channeled into socially acceptable forms of behavior.
Subliminal Perception: The presumed ability to perceive a stimulus that is below the threshold for conscious experience.
Suicide: The act of taking one's own life.
Superego: According to Freud, the portion of human personality representing the conscience.
Suprachiasmatic Nucleus: A portion of the hypothalamus that seems to play an important role in the regulation of circadian rhythms.
Surface Structure: The actual words of which sentences consist.
Survey Method: A research method in which large numbers of people answer questions about aspects of their views or their behavior.
Syllogistic Reasoning: A type of formal reasoning in which two premises are used as the basis for deriving logical conclusions.
Sympathetic Nervous System: The portion of the autonomic nervous system that readies the body for expenditure of energy.
Synapse: A region where the axon of one neuron closely approaches other neurons or the cell membrane of other types of cells such as muscle cells.
Synaptic Vesicles: Structures in the axon terminals that contain various neurotransmitters.
Syntax: Rules about how units of speech can be combined into sentences in a given language.
Systematic Desensitization: A form of behavior therapy in which individuals imagine scenes or events that are increasingly anxiety-provoking and at the same time engage in procedures that induce feelings of relaxation.

Tardive Dyskinesia: A side effect of prolonged exposure to antipsychotic drugs in which individuals experience involuntary muscular movements, especially of the face.
Temperament: Stable individual differences in the quality and intensity of emotional reactions.
Templates: Specific patterns stored in our memories for various visual stimuli that we encounter.
Temporal Lobe: The lobe of the cerebral cortex that is involved in hearing.
Teratogens: Factors in the environment that can harm the developing fetus.
Tertiary Prevention: Techniques designed to minimize the harm done by psychological disorders.
Test-Retest Reliability: The extent to which a psychological test yields similar scores when taken by the same person on different occasions.
Thalamus: A structure deep within the brain that receives sensory input from other portions of the nervous system and then transmits this information to the cerebral hemispheres and other parts of the brain.
That's-Not-All Approach: A technique for gaining compliance in which a small extra incentive is offered before the target person has agreed to or rejected a request.
Thematic Apperception Test (TAT): A psychological test used to assess individual differences in several motives, such as achievement motivation and power motivation.
Theories: In science, frameworks for explaining various phenomena. Theories consists of two major parts: basic concepts and assertions concerning relationships between these concepts.
Therapeutic Alliance: The special relationship between therapist and client that contributes to the effectiveness of many forms of psychotherapy.
Timbre: The quality of a sound, resulting from the complex makeup of a sound wave; timbre helps us to distinguish the sound of a trumpet from that of a saxophone.
Tip-of-the-Tongue Phenomenon: The feeling that we can almost remember some information we wish to retrieve from memory.
Token Economies: Forms of behavior therapy based on operant conditioning, in which hospitalized patients earn tokens they can exchange for valued rewards when they behave in ways the hospital staff consider to be desirable.
Tolerance: Habituation to a drug, causing larger and larger doses to be required to produce effects of the same magnitude.
Trace Conditioning: A form of forward conditioning in which the presentation of the conditioned stimulus precedes and does not overlap with the presentation of the unconditioned stimulus.
Tracking: Tasks, such as driving, in which individuals make adjustments to approach as closely as possible to some target value.
Trait Theories: Theories of personality that focus on identifying the key dimensions along which people differ.
Transduction: The translation of physical energy into electrical signals by specialized receptor cells.

Transference: Strong positive or negative feelings toward the therapist on the part of individuals undergoing psychoanalysis.
Transformational Leaders: Leaders who exert profound effects on their followers and establish special types of relationships with them.
Trephining: An ancient surgical procedure in which holes are cut into the skull.
Trial and Error: A method of solving problems in which possible solutions are tried until one succeeds.
Triarchic Theory: A theory suggesting that there are actually three distinct kinds of intelligence.
Trichromatic Theory: A theory of color perception suggesting that we have three types of cones, each primarily receptive to particular wavelengths of light.
Type A Behavior Pattern: A cluster of traits such as competitiveness, aggressiveness, urgency, and hostility; related to important aspects of health, social behavior, and task performance.

Unconditional Positive Regard: In Rogers's theory, communicating to others that they will be respected or loved regardless of what they say or do.
Unconditioned Response (UCR): In classical conditioning, the response elicited by an unconditioned stimulus.
Unconditioned Stimulus (UCS): In classical conditioning, a stimulus that can elicit an unconditioned response the first time it is presented.

Validity: The extent to which tests actually measure what they claim to measure.
Variable-Interval Schedule: A schedule of reinforcement in which a variable amount of time must elapse before a response will yield reinforcement.
Variable-Ratio Schedule: A schedule of reinforcement in which reinforcement is delivered after a variable number of responses have been performed.
Variance: A measure of dispersion reflecting the average squared distance between each score and the mean.
Vestibular Sacs: Fluid-filled sacs in our inner ear that provide information about the positions and changes in linear movement of our head and body.
Vestibular Sense: Our sense of balance.
Visual Displays: Displays that present information visually.
Visual Images: Mental pictures or representations of objects or events.

Warnings: Messages designed to alert users of various products and services, or the general public, to potential hazards.
Wavelength: The peak-to-peak distance in a sound or light wave.
Wear-and-Tear Theories of Aging: Theories suggesting that aging results from continuous use of cells and organs within our bodies.
Wernicke-Geschwind Theory: A theory of how the brain processes information relating to speech and other verbal abilities. Although the theory has generated a considerable amount of research, recent evidence suggests that it does not provide an adequate picture of this process.
Work Motivation: Motivation to perform and complete various tasks.

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